IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT

Border canyon between Imperial County and Mexicali, Mexico; Story of undocumented from the Desert Sun by Brett Kelman and Gustavo Solis; https://www.desertsun.com/story/news/investigations/2016/07/06/border-bodies-california-mexico/85193162/

May 11, 2014
Exceptional Event Documentation
For the Imperial County PM_{10} Nonattainment Area

FINAL REPORT

August 24, 2018

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ACRONYM	DESCRIPTIONS
AQI	Air Quality Index
AQS	Air Quality System
BACM	Best Available Control Measures
BAM 1020	Beta Attenuation Monitor Model 1020
BLM	United States Bureau of Land Management
BP	United States Border Patrol
CAA	Clean Air Act
CARB	California Air Resources Board
CMP	Conservation Management Practice
DCP	Dust Control Plan
DPR	California Department of Parks and Recreation
EER	Exceptional Events Rule
EPA	Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
GOES-W/E	Geostationary Operational Environmental Satellite (West/East)
HF	Historical Fluctuations
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model
ICAPCD	Imperial County Air Pollution Control District
ITCZ	Inter Tropical Convergence Zone
KBLH	Blythe Airport
KCZZ	Campo Airport
KIPL	Imperial County Airport
KNJK	El Centro Naval Air Station
KNYL/MCAS	Yuma Marine Corps Air Station
KPSP	Palm Springs International Airport
KTRM	Jacqueline Cochran Regional Airport (aka Desert Resorts Rgnl Airport)
LST	Local Standard Time
MMML/MXL	Mexicali, Mexico Airport
MPH	Miles Per Hour
MST	Mountain Standard Time
NAAQS	National Ambient Air Quality Standard
NCAR	National Center for Atmospheric Research
NCEI	National Centers for Environmental Information
NEAP	Natural Events Action Plan
NEXRAD	Next-Generation Radar
NOAA	National Oceanic and Atmospheric Administration
nRCP	Not Reasonably Controllable or Preventable
NWS	National Weather Service
PDT	Pacific Daylight Time
PM10	Particulate Matter less than 10 microns
PM2.5	Particulate Matter less than 2.5 microns

PST	Pacific Standard Time
QA/QC	Quality Assured and Quality Controlled
QCLCD	Quality Controlled Local Climatology Data
RACM	Reasonable Available Control Measure
RAWS	Remote Automated Weather Station
SIP	State Implementation Plan
SLAMS	State Local Ambient Air Monitoring Station
SMP	Smoke Management Plan

I Introduction

On May 11, 2014, State and Local Ambient Air Monitoring Station (SLAMS) located in Niland (AQS Site ID 060254004), California measured an exceedance of the National Ambient Air Quality Standard (NAAQS). The Federal Equivalent Method (FEM), Beta Attenuation Monitor Model 1020 (BAM 1020) measured a (midnight to midnight) 24-hr average Particulate Matter less than 10 microns (PM_{10}) concentration of 172 µg/m^3. PM_{10} 24-hr measurements above the 150 µg/m^3 are exceedances of the NAAQS. The SLAMS in Niland was the only station, in Imperial County to measure an exceedance of the PM_{10} NAAQS on May 11, 2014.

TABLE 1-1
CONCENTRATIONS OF PM_{10} ON MAY 11, 2014

DATE	MONITORING SITE	AQS ID	POC(s)	HOURS	24-HOUR CONCENTRATION µg/m^3	PM_{10} NAAQS µg/m^3
5/11/2014	**Niland**	**06-025-4004**	**3**	**19**	**172**	**150**
5/11/2014	Calexico	06-025-0005	1	24	126	150
5/11/2014	El Centro	06-025-1003	2	24	120	150
5/11/2014	Brawley	06-025-0007	1	24	127	150
5/11/2014	Brawley	06-025-0007	3	24	135	150
5/11/2014	Niland	06-025-4004	1	24	103	150
5/11/2014	Westmorland	06-025-4003	1	24	85	150

All time referenced throughout this document is in Pacific Standard Time (PST) unless otherwise noted[1]

The Imperial County Air Pollution Control District (ICAPCD) has been submitting PM_{10} data from Federal Reference Method (FRM) Size Selective Inlet (SSI) instruments since 1986 into the United States Environmental Protection Agency's (USEPA) Air Quality System (AQS). Prior to 2013 all continuous measured PM_{10} data was non-regulatory, thus measured in local conditions. However, by 2013 ICAPCD began formally submitting continuous FEM PM_{10} data from BAM 1020's into the USEPA managed AQS. Because regulatory consideration of reported data must be in standard conditions, as required by USEPA, all continuous PM_{10} data since 2013 is regulatory. On May 11, 2014, the Niland monitor was impacted by elevated particulate matter caused by fugitive windblown dust when a low-pressure system that travelled southeast from the north into the Great Basin and into the Four Corners region brought stronger onshore gradients with gusty northwesterly winds in the mountains and deserts and into Imperial County.[2]

[1] According to the National Institute of Standards and Technology (NIST) Time and Frequency Division the designation of the time of day for specific time zones are qualified by using the term “standard time” or “daylight time”. For year-round use the designation can be left off inferring “local time” daylight or standard whichever is present. For 2014 Pacific Daylight Time (PDT) is March 9 through November 2. https://www.nist.gov/pml/time-and-frequency-division/local-time-faqs#intl

[2] Area Forecast Discussion National Weather Service San Diego CA 310 AM PST (410 AM PDT) and 1255 PM PST (155 PM PDT), Sunday, May 11, 2014.

This report demonstrates that a naturally occurring event caused an exceedance observed on May 11, 2014, which elevated particulate matter and affected air quality. The report provides concentration to concentration monitoring site analyses supporting a clear causal relationship between the event and the monitored exceedances and provides an analysis supporting the not reasonably controllable or preventable (nRCP) criteria. Furthermore, the report provides information that the exceedances would not have occurred without the entrainment of fugitive windblown dust from outlying deserts and mountains within the Sonoran Desert. The document further substantiates the request by the ICAPCD to flag PM_{10} 24-hour NAAQS exceedance of 172 $\mu g/m^3$ as an exceptional event. This demonstration substantiates that this event meets the definition of the USEPA Regulation for the Treatment of Data Influenced by Exceptional Events (EER)[3].

I.1 Demonstration Contents

Section II - Describes the May 11, 2014 event as it occurred in California and into Imperial County, providing background information of the exceptional event and explaining how the event affected air quality. Overall, this section provides the evidence that the event was a natural event.

Section III – Using time-series graphs, summaries and historical concentration comparisons of the Brawley, Niland and Westmorland stations this section discusses and establishes how the May 11, 2014 event affected air quality demonstrating that a clear causal relationship exists between the event and the monitored exceedance. It is perhaps of some value to mention that the time-series graphs include PM_{10} data measured in both local conditions and standard conditions. Measured PM_{10} continuous data prior to 2013 is in local conditions, all other data is in standard conditions. The concentration difference between local and standard conditions has an insignificant impact on any data analysis. Overall, this section provides the evidence that human activity played little or no direct causal role in the May 11, 2014 event and its resulting emissions defining the event as a “natural event”.[4]

Section IV - Provides evidence that the event of May 11, 2014 was not reasonably controllable or preventable despite the full enforcement and implementation of Best Available Control Measures (BACM).

Section V - Brings together the evidence presented within this report to show that the exceptional event affected air quality; that the event was not reasonably controllable or preventable; that there was a clear causal relationship between the event and the exceedance, and that the event was a natural event.

[3] "Treatment of Data Influenced by Exceptional Events; Final Rule", 72 FR 13560, March 22, 2007

[4] Title 40 Code of Federal Regulations part 50: §50.1(k) Natural event means an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions.

I.2 Requirements of the Exceptional Event Rule

The above sections combined comprise the technical requirements described under the Exceptional Events Rule (EER) under 40 CFR §50.14(c)(3)(iv). However, in order for the USEPA to concur with flagged air quality monitoring data, there are additional non-technical requirements.

I.2.a Public Notification that a potential event was occurring (40 CFR §50.14(c)(1))

The ICAPCD and the National Weather Service (NWS) provided notification via the ICAPCD's webpage that winds 20 to 30 mph and gust to 45 miles per hour (mph) could affect this region, potentially elevating particulate matter. Because of the potential for suspended particles and poor air quality, the ICAPCD issued a "No Burn" day in Imperial County. In addition, the ICAPCD posted the notices issued by the National Weather Service (NWS) Phoenix office warning of the potential for blowing dust and sand. **Appendix A** contains notices pertinent to the May 11, 2014 event.

I.2.b Initial Notification of Potential Exceptional Event (INPEE) (40 CFR §50.14(c)(2))

States are required under federal regulation to submit measured ambient air quality data into the AQS. AQS is the federal repository of Quality Assured and Quality Controlled (QA/QC) ambient air data used for regulatory purposes. When States intend to request the exclusion of one or more exceedances of a NAAQS as an exceptional event a notification to the Administrator is required. Notification occurs when an agency submits a request, which includes an initial event description, for flagging data in AQS.

On October 3, 2016, the US EPA promulgated revisions to the Exceptional Events rule, which included the requirement of an "Initial Notification of Potential Exceptional Event" (INPEE) process. This revised INPEE process requires communication between the US EPA regional office and the State, prior to the development of a demonstration. The intent of the INPEE process is twofold: to determine whether identified data may affect a regulatory decision and whether a State should develop/submit an EE Demonstration.

The ICAPCD made a formal written request to the California Air Resources Board (CARB) to place preliminary flags on the SLAMS measured concentrations from the Niland monitor. The request, dated May 28, 2015 requested an initial flag for the measurement from the BAM 1020 in Niland of 172 $\mu g/m^3$. Subsequently, after submittal of the request, CARB received corrected FEM data measurements in standard conditions, originally submitted in local conditions. USEPA requires data in standard conditions when making regulatory decisions. **Table 1-1** above provides the PM_{10} measured concentrations for all monitors in Imperial County for May 11, 2014. The difference in concentrations between local and standard has an insignificant impact on any data analysis. The submitted request included a brief description of the meteorological conditions for May 11, 2014 indicating that a potential natural event occurred.

I.2.c Documentation that the public comment process was followed for the event demonstration that was flagged for exclusion (40 CFR §50.14(c)(3)(v))

The ICAPCD posted, for a 30-day public review, a draft version of this demonstration on the ICAPCD webpage and published a notice of availability in the Imperial Valley Press on January 10, 2018. The notice advised the public that comments were being solicited regarding the demonstration, which supports the request, by the ICAPCD, to exclude the measured concentration of 172 $\mu g/m^3$ that occurred on May 11, 2014 in Niland. The final closing date for comments was February 12, 2018. **Appendix A** contains a copy of the public notice affidavit along with any comments received by the ICAPCD for submittal as part of the demonstration (40 CFR §50.14(c)(3)(v)).

I.2.d Documentation submittal supporting an Exceptional Event Flag (40 CFR §50.14(c)(3)(i))

States that have flagged data as a result of an exceptional event and who have requested an exclusion of said flagged data are required to submit a demonstration that justifies the data exclusion to the USEPA in accordance with the due date established by USEPA during the INPEE process (40 CFR §50.14(c)(2)). Currently, bi-weekly meetings between USEPA, CARB and Imperial County are set to discuss each flagged exceedance for 2014.

The ICAPCD, after the close of the comment period and after consideration of the comments will submit this demonstration along with all required elements, including received comments and responses to USEPA Region 9 in San Francisco, California. The submittal of the May 11, 2014 demonstration will have a regulatory impact upon the development and ultimate submittal of the PM_{10} State Implementation Plan for Imperial County in 2017.

I.2.e Necessary demonstration to justify an exclusion of data under (40 CFR§50.14(c)(3)(iv))

A This demonstration provides evidence that the event, as it occurred on May 11, 2014, satisfies the definition in 40 CFR §50.1(j) and (k) for an exceptional event.

- a The event created the meteorological conditions that entrained emissions and caused the exceedance.
- b The event clearly "affects air quality" such that there is the existence of a clear causal relationship between the event and the exceedance.
- c Analysis demonstrates that the event-influenced concentrations compared to concentrations at the same monitor at other times supports the clear causal relationship.
- d The event "is not reasonably controllable and not reasonably preventable."
- e The event is "caused by human activity that is unlikely to recur at a particular location or [is] a natural event."
- f The event is a "natural event" where human activity played little or no direct causal role.

B This demonstration provides evidence that the exceptional event affected air quality in Imperial County by demonstrating a clear causal relationship between the event and the measured concentrations in Niland.

C This demonstration provides evidence of the measured concentrations to concentrations at the same monitor at other times supporting the clear causal relationship between the event and the affected monitor.

II May 11, 2014 Conceptual Model

This section provides a summary description of the meteorological and air quality conditions under which the May 11, 2014 event unfolded in Imperial County. The subsection elements include

- » A description and map of the geographic setting of the air quality and meteorological monitors
- » A description of Imperial County's climate
- » An overall description of meteorological and air quality conditions on the event day.

II.1 Geographic Setting and Monitor Locations

According to the United States Census Bureau, Imperial County has a total area of 4,482 square miles of which 4,177 square miles is land and 305 square miles is water. Much of Imperial County is below sea level and is part of the Colorado Desert an extension of the larger Sonoran Desert **(Figure 2-1)**. The Colorado Desert not only in includes Imperial County but a portion of San Diego County.

FIGURE 2-1
COLORADO DESERT AREA IMPERIAL COUNTY

Fig 2-1: 1997 California Environmental Resources Evaluation System. According to the United States Geological Survey (USGS) Western Ecological Research Center the Colorado Desert bioregion is part of the bigger Sonoran Desert Bioregion which includes the Colorado Desert and Upper Sonoran Desert sections of California and Arizona, and a portion of the Chihuahuan Basin and Range Section in Arizona and New Mexico (Forest Service 1994)

A notable feature in Imperial County is the Salton Sea, which is at approximately 235 feet below sea level. The Chocolate Mountains are located east of the Salton Sea and extend in a northwest-southeast direction for approximately 60 miles **(Figure 2-2)**. In this region, the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect the northern-most extensions of the East Pacific rise. Consequently, the region is subject to earthquakes and the crust is being stretched, resulting in a sinking of the terrain over time.

FIGURE 2-2
SURROUNDING AREAS OF THE SALTON SEA

Fig 2-2: Image courtesy of the Image Science and Analysis Laboratory NASA Johnson Space Center, Houston Texas.

All of the seven incorporated cities, including the unincorporated township of Niland, are surrounded by agricultural fields to the north, east, west and south **(Figure 2-6)**. Together, the incorporated cities, including Niland, and the agricultural fields make what is known as the Imperial Valley. Surrounding the Imperial Valley are desert areas found on the eastern and western portions of Imperial County.

The desert area, found within the western portion of Imperial County is of note because of its border with San Diego County. From west to east, San Diego County stretches from the Pacific Ocean to its boundary with Imperial County. San Diego County has a varied topography. On its western side is 70 miles (110 km) of coastline. Most of San Diego between the coast and the Laguna Mountains consists of hills, mesas, and small canyons. Snow-capped (in winter) mountains rise to the northeast, with the Sonoran Desert to the far east. Cleveland National Forest is spread across the central portion of the county, while the Anza-Borrego Desert State Park occupies most of the northeast. The southeastern portion of San Diego County is comprised of distinctive Peninsular mountain ranges. The mountains and deserts of San Diego comprise the eastern two-thirds of San Diego County and are primarily undeveloped back county with a native plant community known as chaparral. Of the nine major mountain ranges within San Diego County, the In-Ko-Pah Mountains and the Jacumba Mountains border Mexico and Imperial County.

Both mountain ranges provide the distinctive weathered dramatic piles of residual boulders that can be seen while driving Interstate 8 from Imperial County through Devil's Canyon and In-Ko-Pah Gorge. Interstate 8 runs along the US border with Mexico from San Diego's Mission Bay to just southeast of Casa Grande Arizona.

FIGURE 2-3
JACUMBA PEAK

Fig 2-3: The Jacumba Mountains reach an elevation of 4,512 feet (1,375 m) at Jacumba Peak, near the southern end of the chain. Source: Wikipedia at https://en.wikipedia.org/wiki/Jacumba_Mountains

Northwest and northeast of the Jacumba Mountains is the Tierra Blanca Mountains, the Sawtooth Mountains and Anza-Borrego Desert State Park. Within the mountain ranges and the Anza-Borrego Desert State Park, there exists the Vallecito Mountains, the Carrizo Badlands, the Carrizo Impact Area, Coyote Mountains and the Volcanic Hills to name of few. Characteristically, these areas all have erosion that has occurred over time that extends from the Santa Rosa Mountains into northern Baja California in Mexico. For example, the Coyote Mountains consists of sand dunes left over from the ancient inland Sea of Cortez. Much of the terrain is still loose dirt, interspersed with sandstone and occasional quartz veins. The nearest community to the Coyote Mountain range is the community of Ocotillo. Of interest are the fossilized and hollowed out sand dunes that produce wind caves.

FIGURE 2-4
ANZA-BORREGO DESERT STATE PARK
CARRIZO BADLANDS

Fig 2-4: View southwest across the Carrizo Badlands from the Wind Caves in Anza-Borrego Desert State Park. Source: Wikipedia at https://en.wikipedia.org/wiki/Carrizo_Badlands

The Carrizo Badlands, which includes the Carrizo Impact Area used by the US Navy as an air-to-ground bombing range during World War II and the Korean War, lies within the Anza-Borrego Desert State Park. The Anza-Borrego Desert State Park is located within the Colorado Desert, is the largest state park in California occupying eastern San Diego County, reaching into Imperial and Riverside counties. The two communities within Anza-Borrego Desert State Park are Borrego Springs and Shelter Valley.

The Anza-Borrego Desert State Park lies in a unique geologic setting along the western margin of the Salton Trough. The area extends north from the Gulf of California to San Gorgonio Pass and from the eastern rim of the Peninsular Ranges eastward to the San Andreas Fault zone along the far side of the Coachella Valley. The Anza-Borrego region changed gradually over time from intermittently being fed by the Colorado River Delta to dry lakes and erosion from the surrounding mountain ranges. The area located within the southeastern and northeastern section of San Diego County is a source of entrained fugitive dust emissions that impact Imperial County when westerly winds funnel through the unique landforms causing in some cases wind tunnels that cause increases in wind speeds.

Historical observations have indicated that the desert slopes and mountains of San Diego are a source of fugitive emissions along with those deserts located to the east and west of Imperial County, which extend into Mexico (Sonoran Desert, **Figure 2-7**). Combined, the desert areas and mountains of San Diego and the desert areas that extend into Mexico are sources of dust emissions, which affect the Imperial County during high wind events.

FIGURE 2-5
ANZA-BORREGO DESERT STATE PARK
DESERT VIEW FROM FONT'S POINT

Fig 2-5: Desert view from Font's Point. Source: Font's Point Anza-Borrego Photographed by and copyright of (c) David Corby; Wikipedia at https://en.wikipedia.org/wiki/Anza-Borrego_Desert_State_Park

FIGURE 2-6
LOCATION AND TOPOGRAPHY OF IMPERIAL COUNTY

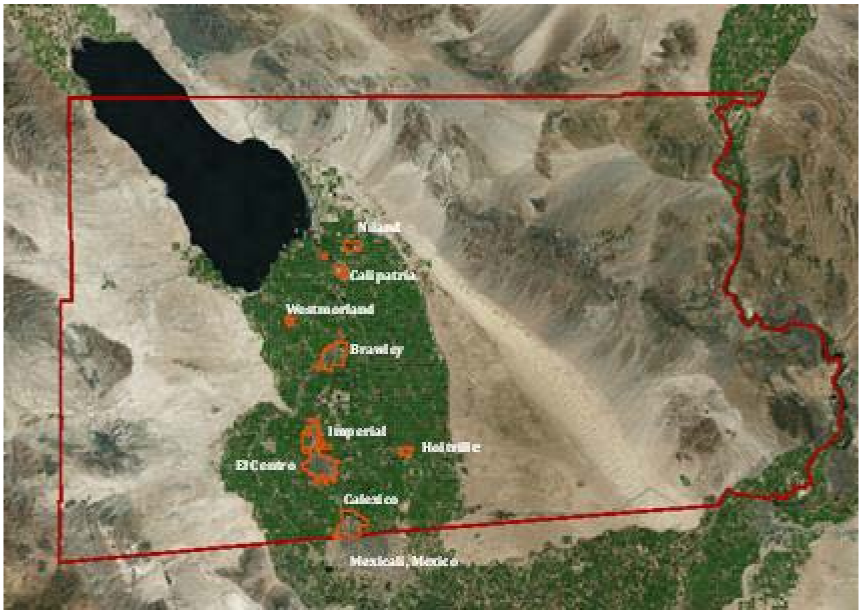

Fig 2-6: Depicts the seven incorporated cities within Imperial Valley - City of Calipatria, City of Westmorland, City of Brawley, City of Imperial, City of El Centro, City of Holtville, City of Calexico. Niland is unincorporated. Mexicali, Mexico is to the south

FIGURE 2-7
DESERTS IN CALIFORNIA, YUMA AND MEXICO

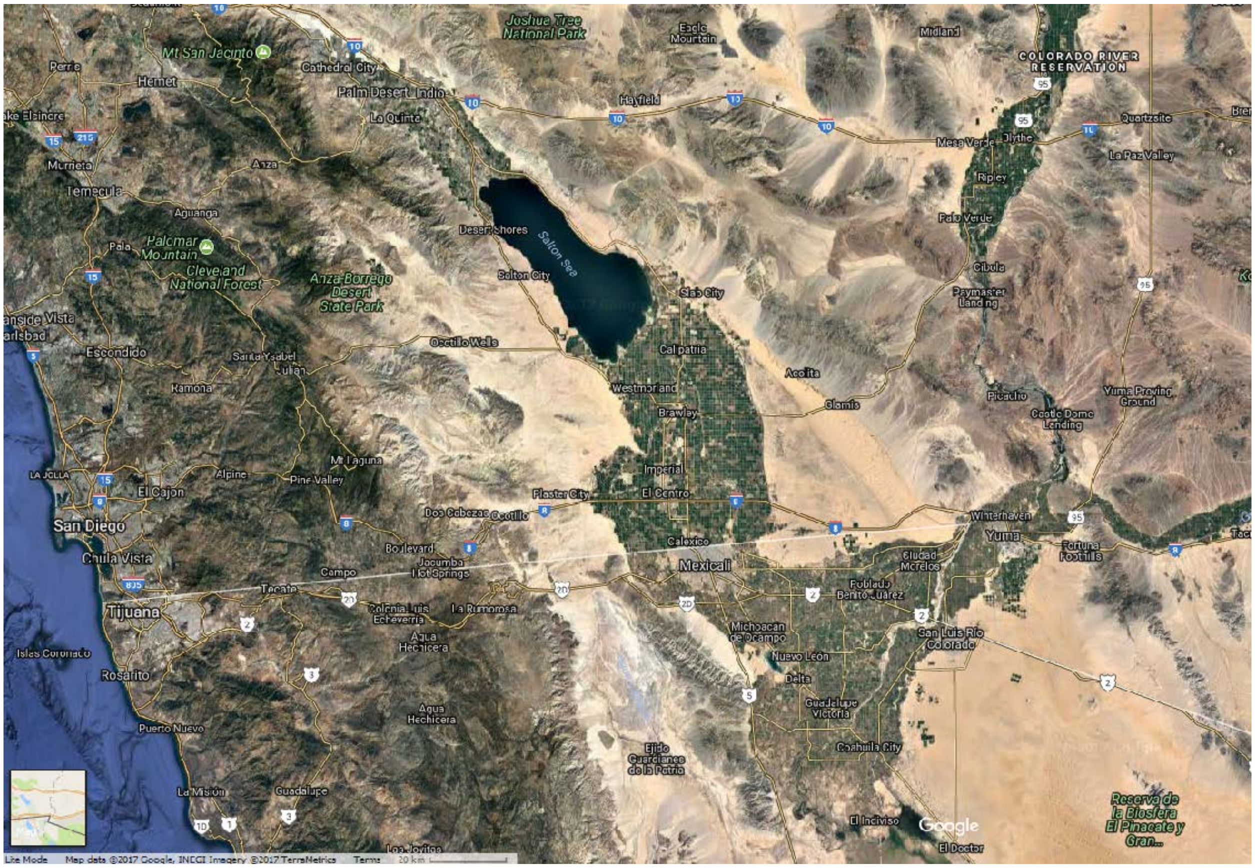

Fig 2-7: Depicts the Sonoran Desert as it extends from Mexico into Imperial County. Source: Google Earth Terra Matrics

The air quality and meteorological monitoring stations used in this demonstration are shown in **Figure 2-8**. Of the five SLAMS within Imperial County four stations measure both meteorological and air quality data. These SLAMS are located in Calexico, El Centro, Westmorland, and Niland; the station located in Brawley only measures air quality. Other air monitoring stations measuring air quality and meteorological data used for this demonstration include stations in eastern Riverside County, southeastern San Diego County and southwestern Arizona (Yuma County) **(Figure 2-8 and Table 2-1)**.

As mentioned above, the PM_{10} exceedance on May 11, 2014 occurred at the Niland station. The Brawley, Niland and Westmorland stations are regarded as the "northern" monitoring sites within the Imperial County air monitoring network. In order to properly analyze the contributions from meteorological conditions occurring on May 11, 2014, other meteorological sites were used in this demonstration which include airports in eastern Riverside County, southeastern San Diego County, southwestern Arizona (Yuma County), Imperial County, and other sites relevant to the wind event, such as within northern Mexico. **(Figure 2-8 and Appendix B)**.

FIGURE 2-8
MONITORING SITES IN AND AROUND IMPERIAL COUNTY

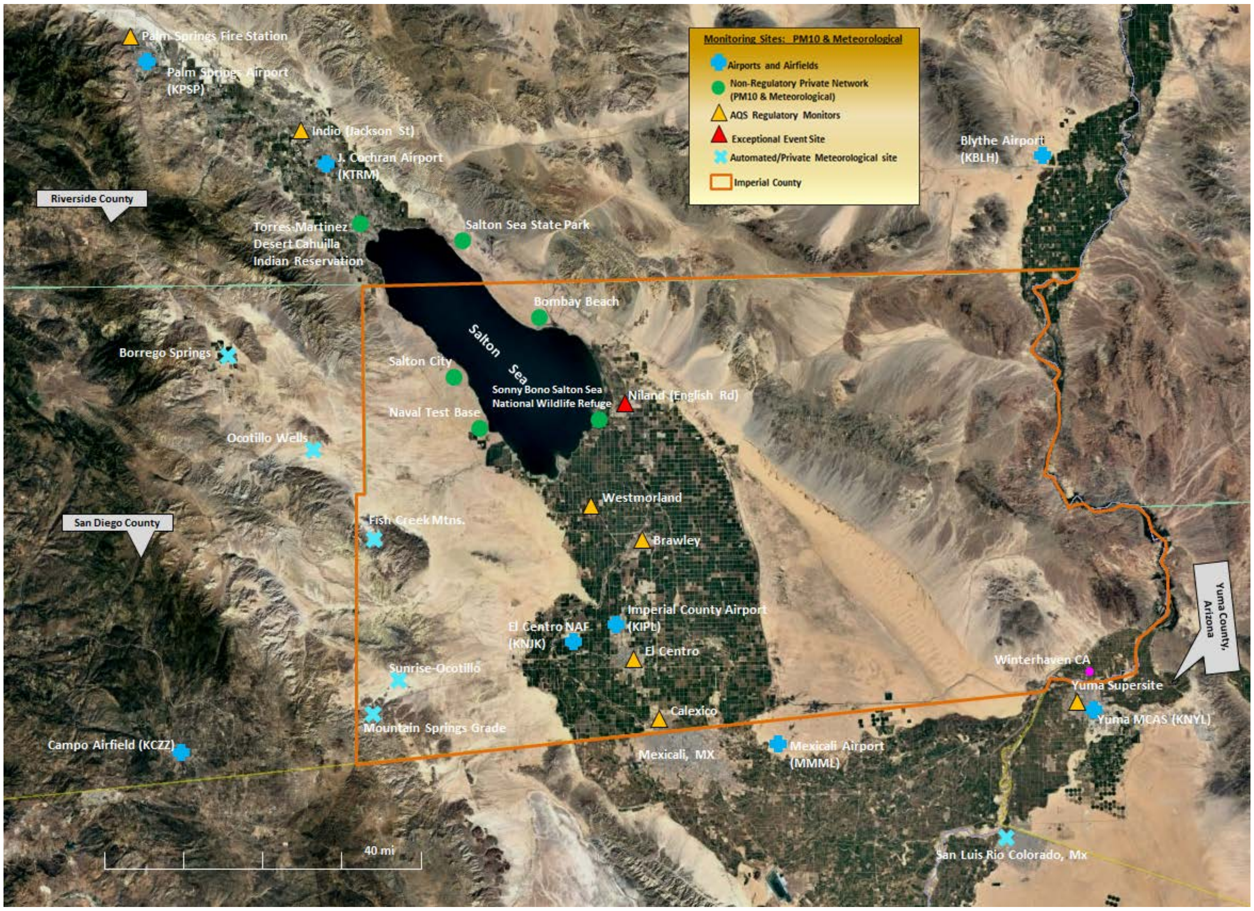

Fig 2-8: Depicts a select group of meteorological and PM_{10} monitoring sites in Imperial County, eastern Riverside County, southeastern San Diego County, southwestern Arizona (Yuma County), and northern Mexico. The image provides the location of potential sites used to gather data in support of an Exceptional Event Demonstration. Source: Google Earth

In addition to meteorological sites, there are non-regulatory PM_{10} sites located around the Salton Sea that may be referenced as an aid to help the reader understand the direction and velocity of winds that affect Imperial County. Unless otherwise specifically indicated, concentration references do not imply emissions from the surrounding playa of the Salton Sea. Three sites, in specific, are the Salton City air monitoring station, the Naval Test Base air monitoring station and the Sonny Bono air monitoring station. These stations are privately owned and non-regulatory **(Figures 2-9 to 2-12)**. The Salton City station is located 33.27275°N latitude and 115.90062˚W longitude, on the western edge of the Salton Sea **(Figure 2-9)**. The station abuts a water reservoir along the Salton Sea with surrounding chaparral vegetation and unpaved open areas and roads. The Naval Test Base station is located 33.16923°N latitude and 115.85593˚W longitude, on the southwestern edge of the Salton Sea **(Figure 2-11)**. The station sits on an abandoned US Military site, still owned by the Department of Defense. Unlike the Salton City station, light chaparral vegetation and sandy open dune areas surround the Naval Test Base station. Directly to the west of the station is an orchard. The Sonny Bono station is located 33.17638°N latitude and 115.62310˚W longitude, on the southern portion of the Salton Sea within the Sonny Bono Salton Sea Wildlife Refuge. The Sonny Bono Salton Sea National Wildlife Refuge is 40 miles north of the Mexican border at the southern end of the Salton Sea within the Sonoran Desert. The Refuge has two separate managed units, 18 miles apart. Each unit contains wetland habitats, farm fields, and tree rows. The land of the Salton Sea Refuge is flat, except for Rock Hill, a small, inactive volcano, located near Refuge Headquarters. Bordering the Refuge is the Salton Sea on the north and farmlands on the east, south, and west.

FIGURE 2-9
SALTON CITY AIR MONITORING STATION

Fig 2-9: Depicts the Salton City air monitoring (circled) site operated by a private entity. Site photos can be seen at the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-10
SALTON CITY AIR MONITORING STATION
WEST

Fig 2-10: Photograph taken by the California Air Resources Board audit team in 2017. The photograph taken from the west facing the probe. https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-11
NAVAL TEST BASE AIR MONITORING STATION

Fig 2-11: Depicts the Naval Test Base air monitoring (circled) site operated by a private entity. To view the site photos visit the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13603&date=17

FIGURE 2-12
NAVAL TEST BASE AIR MONITORING STATION
WEST

Fig 2-12: Photograph taken by the California Air Resources Board audit team in 2017. The photograph taken from the west facing the probe. https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-13
SONNY BONO AIR MONITORING STATION

Fig 2-13: Depicts the Sonny Bono air monitoring (circled) site operated by a private entity. To view the site photos visit the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-14
SONNY BONO SALTON SEA NATIONAL WILDLIFE REFUGE

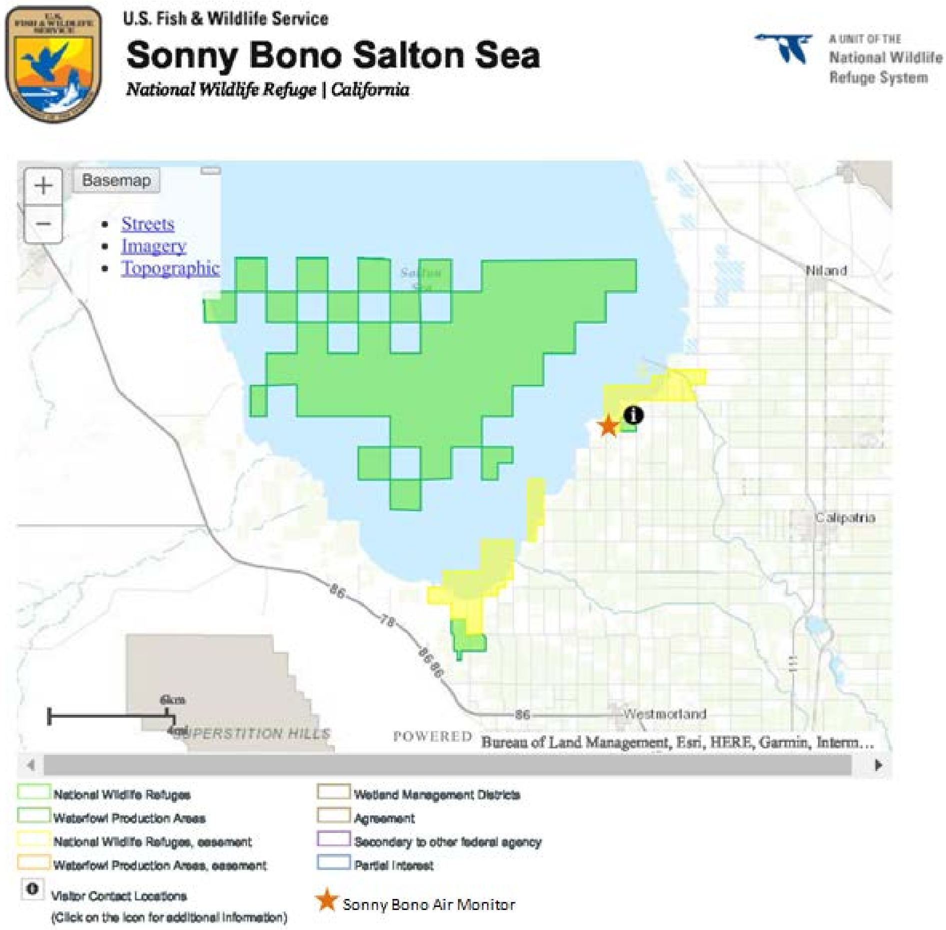

Fig 2-14: The Sonny Bono Wildlife Refuge has about 2,000 acres that are farmed and managed for wetlands. In 1998, the Refuge was renamed after Congressman Sonny Bono, who helped inform the U.S. Congress of the environmental issues facing the Salton Sea as well as acquiring funding for this Refuge to help it respond to avian disease outbreaks and other habitat challenges at the Salton Sea. Source: https://www.fws.gov/refuge/Sonny_Bono_Salton_Sea/about.html

TABLE 2-1
MONITORING SITES IN IMPERIAL COUNTY, RIVERSIDE COUNTY AND ARIZONA
MAY 11, 2014

Monitor Site Name	*Operator	Monitor Type	AQS ID	AQS PARAMETER CODE	ARB Site Number	Elevation (meters)	Day	24-hr PM_{10} (ug/m^3) Avg***	1-hr PM_{10} (ug/m^3) Max	**Time of Max Reading	Max Wind Speed (mph)	**Time of Max Wind Speed
IMPERIAL COUNTY												
Brawley-Main Street #2	ICAPCD	Hi-Vol Gravimetric	06-025-0007	(81102)	13701	-15	11	127	-	-	-	-
		BAM 1020						136	493	0000		
Calexico-Ethel Street	CARB	Hi-Vol Gravimetric	06-025-0005	(81102)	13698	3	11	126	-	-	14.8	1200
El Centro-9th Street	ICAPCD	Hi-Vol Gravimetric	06-025-1003	(81102)	13694	9	11	120	-	-	9.1	1300
Niland-English Road	ICAPCD	Hi-Vol Gravimetric	06-025-4004	(81102)	13997	-54	11	103	-	-	26.6	1100
		BAM 1020						172	601	1100		
Westmorland	ICAPCD	Hi-Vol Gravimetric	06-025-4003	(81102)	13697	-43	11	85	-	-	-	-
RIVERSIDE COUNTY												
Palm Springs Fire Station	SCAQMD	TEOM	06-065-5001	(81102)	33137	174	11	43.9	97	0800	-	-
Indio (Jackson St.)	SCAQMD	TEOM	06-065-2002	(81102)	33157	1	11	104.1	500	0800	-	-
ARIZONA – YUMA												
Yuma Supersite	ADEQ	TEOM	04-027-8011	(81102)	N/A	60	11	245.7	1523	0000	-	-

*CARB = California Air Resources Board
*ICAPCD = Air Pollution Control District, Imperial County
*SCAQMD = South Coast Air Management Quality District
*ADEQ =Arizona Department of Environmental Quality

**Time represents the actual time/hour of the measurement in question in Pacific Standard Time (PST) unless otherwise noted

II.2 Climate

As mentioned above, Imperial County is part of the Colorado Desert, which is a subdivision of the larger Sonoran Desert **(Figure 2-15)** encompassing approximately 7 million acres (28,000 km^2). The desert area encompasses Imperial County and includes parts of San Diego County, Riverside County, and a small part of San Bernardino County.

FIGURE 2-15
SONORAN DESERT REGION

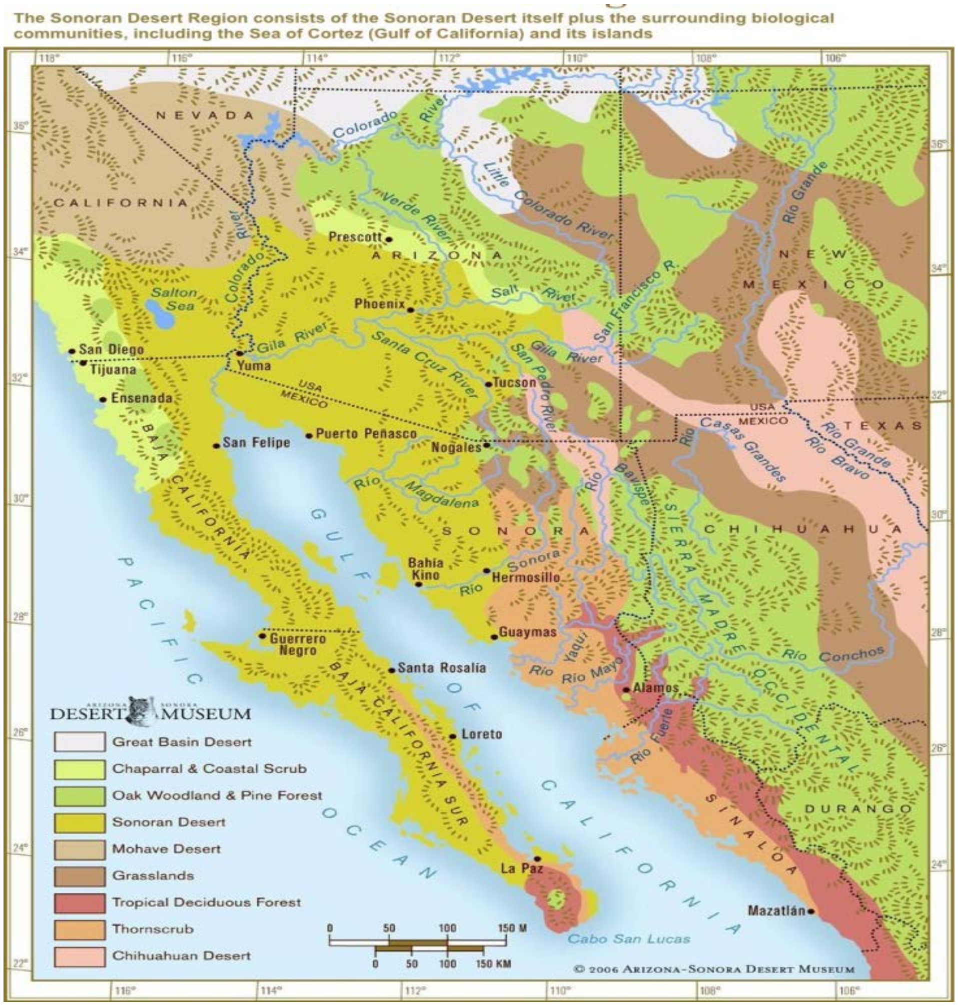

Fig 2-15: Depicts the magnitude of the region known as the Sonoran Desert. Source: Arizona-Sonora Desert Museum at http://desertmuseum.org/center/map.php

The majority of the Colorado Desert lies at a relatively low elevation, below 1,000 feet (300 m), with the lowest point of the desert floor at 275 feet (84 m) below sea level at the Salton Sea. Although the highest peaks of the Peninsular Range reach elevations of nearly 10,000 feet (3,000 m), most of the region's mountains do not exceed 3,000 feet (910 m).

In the Colorado Desert (Imperial County), the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect to the northern-most extensions of the East Pacific Rise. Consequently, the region is subject to earthquakes, and the crust is being stretched, resulting in a sinking of the terrain over time.

The Colorado Desert's climate distinguishes it from other deserts. The region experiences greater summer daytime temperatures than higher-elevation deserts and almost never experiences frost. In addition, the Colorado Desert experiences two rainy seasons per year (in the winter and late summer), especially toward the southern portion of the region which includes a portion of San Diego County. The Colorado Desert portion of San Diego County receives the least amount of precipitation. Borrego Springs, the largest population center within the San Diego desert region averages 5 inches of rain with a high evaporation rate. By contrast, the more northerly Mojave Desert usually has only winter rains.

The west coast Peninsular Ranges, or other west ranges, of Southern California–northern Baja California, block most eastern Pacific coastal air and rains, producing an arid climate. Other short or longer-term weather events can move in from the Gulf of California to the south, and are often active in the summer monsoons. These include remnants of Pacific hurricanes, storms from the southern tropical jet stream, and the northern Inter Tropical Convergence Zone (ITCZ).

The arid nature of the region is demonstrated when historic annual average precipitation levels in Imperial County average 3.11" (**Figure 2-16)**. During the 12 month period prior to the May 11, 2014 event, Imperial County measureed a total annual precipitation of 2.12 inches. Such arid conditions, as those preceding the event, result in soils that are particularly susceptible to particulate suspension by the elevated gusty winds.

FIGURE 2-16
IMPERIAL COUNTY HISTORICAL WEATHER

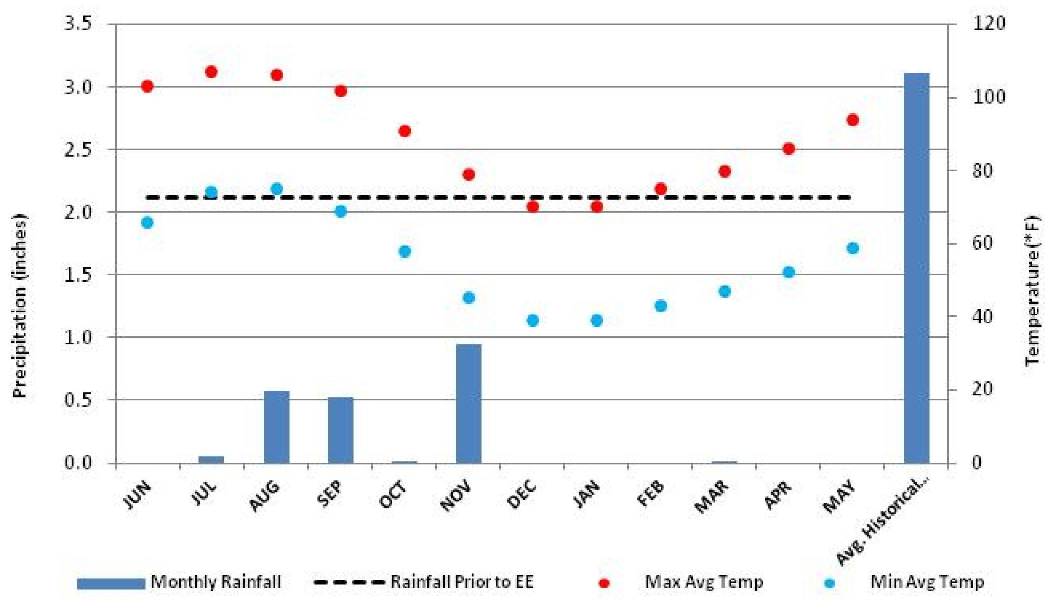

Fig 2-16: Historical Imperial County weather. Prior to May 11, 2014, the region had suffered abnormally low total annual precipitation of 2.12 inches. Average annual precipitation is 3.11 inches. MET data courtesy of Weather Underground, California Observed Climate Normals, and Western Regional Climate Center (WRCC)

The NWS explains that the speed of any wind resulting from a weather system is directly proportional to the change in air pressure, called a pressure gradient, such that when the pressure gradient increases so does the speed of the wind.[5] Because the pressure gradient is just the difference in pressure between high and low pressure areas, changes in weather patterns may recur seasonally.

Typically, high pressure brings clear skies and with no clouds, there is more incoming shortwave solar radiation causing temperatures to rise. When surface winds become light, the cooling of the air produced directly under a high-pressure system can lead to a buildup of particulates in urban areas under an elongated region of relatively high atmospheric pressure or ridge causing widespread haze. Conversely, a trough is an elongated region of relatively low atmospheric pressure often associated with fronts. Troughs may be at the surface, or aloft under various conditions. Most troughs bring clouds, showers, and a wind shift, particularly following the passage of the trough.

While windblown dust events in Imperial County during the summer monsoon season are often due to outflow winds from thunderstorms, windblown dust events in the fall, winter, and spring are usually due to strong winds associated with low-pressure systems and cold fronts moving southeast across California. These winds are the result of strong surface pressure gradients between the approaching low-pressure system, accompanying cold front, and higher pressure ahead of it. As the low-pressure system and cold front approaches and passes, gusty southwesterly winds typically shift to northwesterly causing variable west winds. hese strong winds suspend dust into the atmosphere and transport windblown dust over long distances, especially if soils in the region are dry.

II.3 Event Day Summary

The exceptional event for May 11, 2014, caused by an upper level trough over the Four Corners region slowly shifted east allowing Southern California to remain under northwesterly to northerly flow aloft.[6] The system intensified over southern Nevada leading to a tightening of the pressure gradient. A dry cold front trailed southward into southern California and western Arizona. This resulted in strong, gusty winds blowing over much of southern California. The gusty northerly winds moved across natural open deserts to the north (and NNW) of Imperial County, and were responsible for the exceptional event that affected the Niland monitor on May 11, 2014. The system moved through southern California during the afternoon of May 10, 2014, and through May 11, 2014. **Figure 2-17** provides information regarding the low pressure and cold front that led to the development of high winds.

[5] NWS JetStream – Origin of Wind http://www.srh.noaa.gov/jetstream/synoptic/wind.html
[6] Area Forecast Discussion National Weather Service San Diego CA, 1255 PM PST (155 PM PDT), Sunday, May 11, 2014

FIGURE 2-17
SURFACE WEATHER MAP MAY 11, 2014

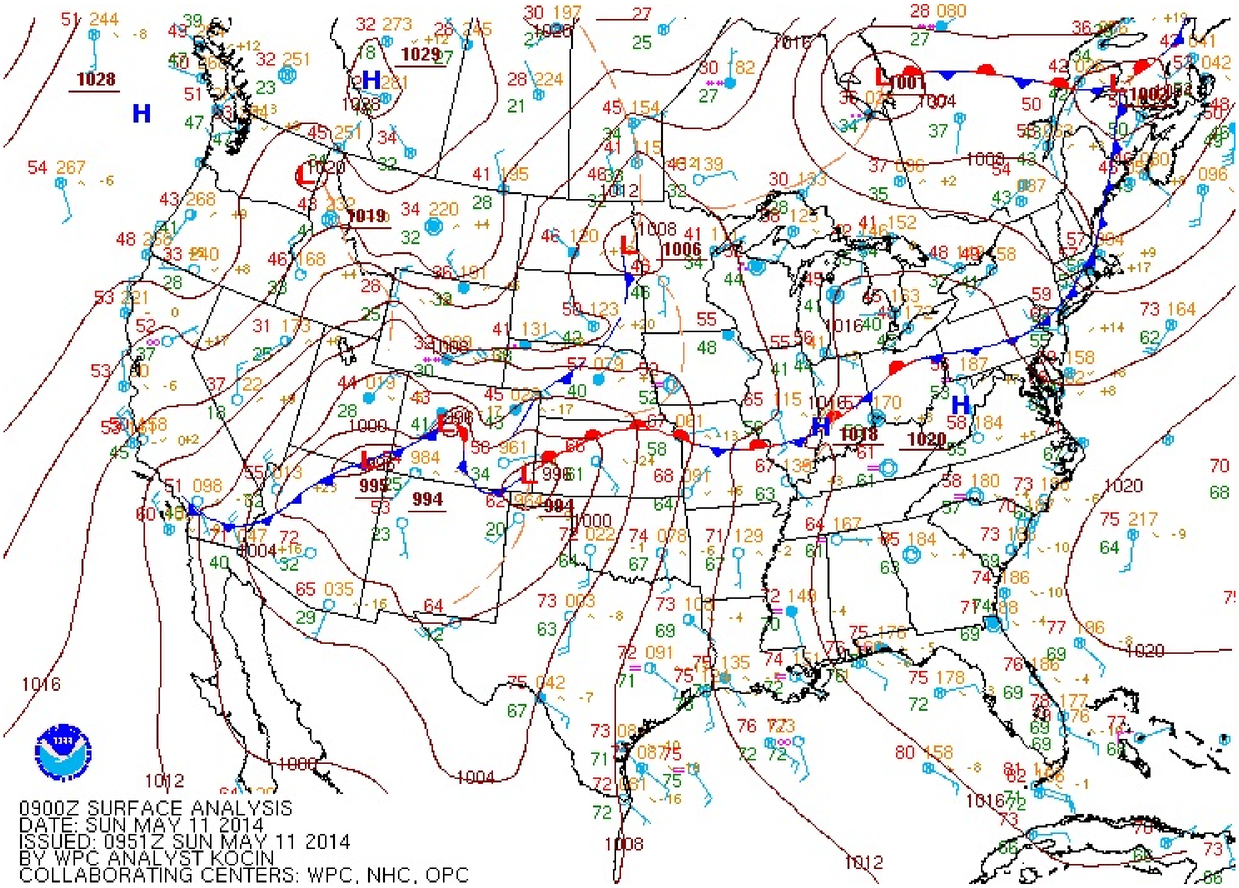

Fig 2-17: A surface weather map at 0100 PST on May 11, 2014 shows a surface low along the Arizona-Utah border, with a (dry) cold front snaking southward into western Arizona and southern California. This led to the development of strong winds over a wide area of southern California and western Arizona. Source: Weather Prediction Center Surface Analysis Archive

FIGURE 2-18
GOES-W VISIBLE SATELLITE IMAGES MAY 11, 2014

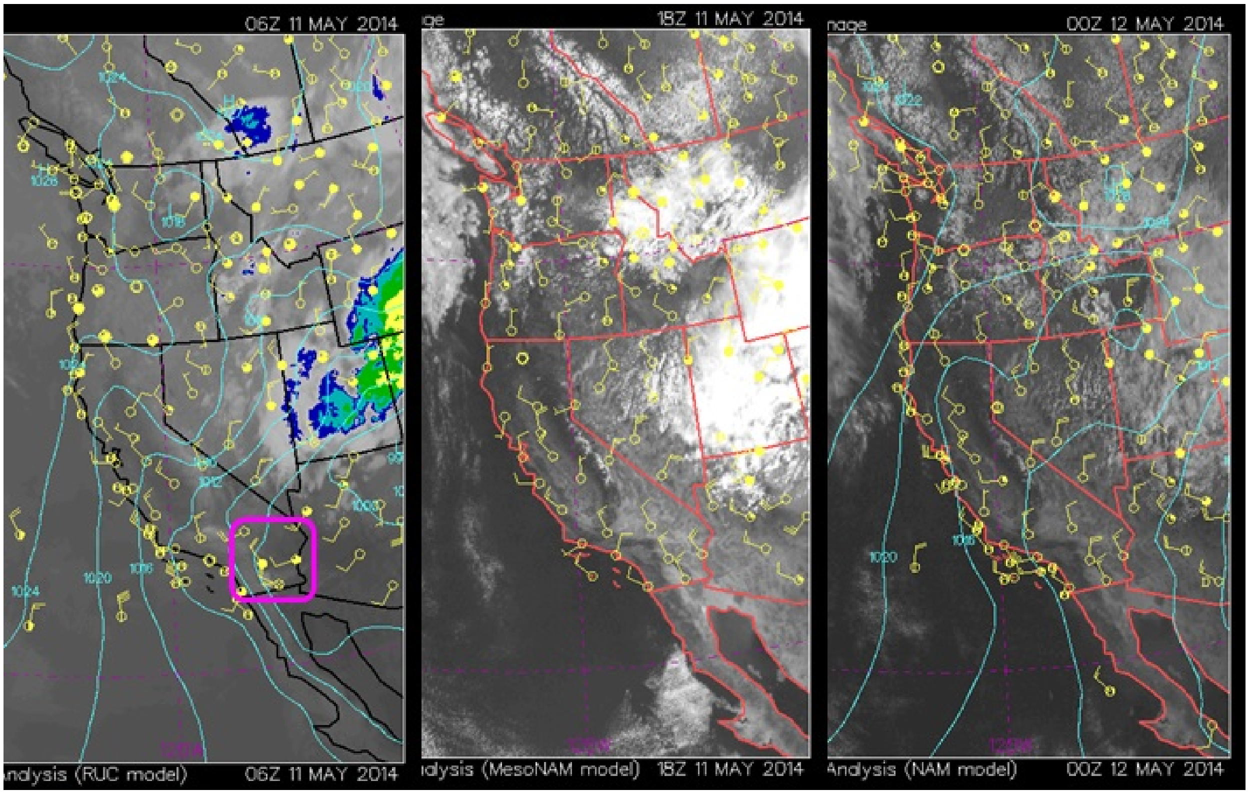

Fig 2-18: A series of GOES-W infrared (left) and visible (middle & right) satellite images with overlaid wind barbs illustrates the wind shift from May 10, 2014 to May 11, 2014. The left image (2200 PST May 10, 2014) illustrates the winds shifting from a westerly to a northwesterly direction (boxed area). The middle and right images (1000 PST and 1600 PST May 10, 2014) depicts wind from the northwest to north over the region. Courtesy of SFSU Earth & Climate Sciences Department and the California Regional weather Server

According to the NWS the upper level low moved inland along the Washington and Oregon coastline during the evening hours of May 9, 2014 with northwesterly flow over Southern California. As the upper level trough continued to move inland digging into the Great Basin before reaching the Four Corners region on May 11, 2014 onshore pressure gradients continued to increase causing the issuance of at least 17 different notices advising of the gusty westerly winds. May 9, 2014 was the earliest issued notice by the San Diego NWS office. Notices, such as Urgent Weather Messages, Public Information Statements, Preliminary Storm Reports, and Hazardous Weather Outlooks contained wind advisories and dust advisories. The affected areas identified in the advisories included, San Diego County Mountains, Coachella Valley, Riverside County Mountains, areas along Interstates 8 and Interstate 10, the Lower Colorado River Valley including the eastern deserts, and Imperial County. **Appendix A** contains copies of notices pertinent to the May 11, 2014 event.

Strong, gusty westerly winds began around 1500 PST on May 10, 2014. By midnight on May 10, 2014 winds subsided but was followed by a measured northwest shift in wind direction at 0300 PST the following day at Niland. A few hours later at 0700 PST, the Imperial County Airport (KIPL) measured the same shift in wind direction with a coincident elevation in wind speed and gusts. The Niland monitor measured spikes in PM_{10} levels shortly thereafter. Winds finally began to subside around 1800 PST on May 11, 2014. Levels of PM_{10} at the Niland monitor measured a likewise decline. **Figure 2-19** is a graphical representation of the ramp-up analysis for May 11, 2014.

FIGURE 2-19
RAMP-UP ANALYSIS MAY 11, 2014

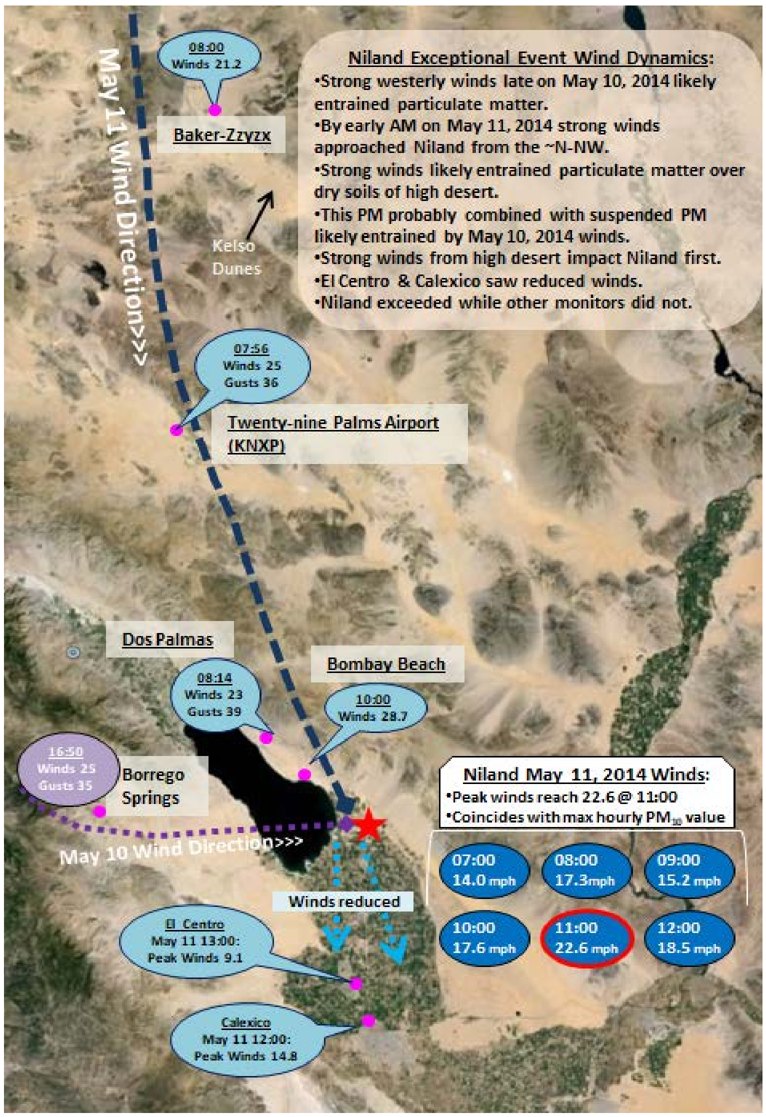

Fig 2-19: A ramp-up analysis for the Niland station identifying the general wind direction with associated increase in wind speed leading up to the measured exceedance on May 11, 2014. Wind direction and speed for Niland taken from the EPA's AQS data bank. Wind speed for other sites comes from the University of Utah's MesoWest data bank

Table 2-2 contains a summary of maximum winds, peak wind gusts, and wind direction at monitors in Imperial County, eastern Riverside County, Yuma County, Arizona, and Mexicali. For detailed meteorological station, graphs see **Appendix B.**

TABLE 2-2
WIND SPEEDS ON MAY 11, 2014

Station Monitor Airport Meteorological Data	Maximum Wind Speed (WS) (mph)	Wind Direction during Max WS (degrees)	*Time of Max Wind Speed	24 hr Maximum Wind Gust (WG) (mph)	Time of Max WG	PM_{10} correlated to time of Max Wind Speed Nlnd	Brly
IMPERIAL COUNTY							
Imperial Airport (KIPL)	30	340	1153	38	1153	601	448
Naval Air Facility (KNJK)	-	-	-	-	-	-	-
Calexico (Ethel St)	14.8	336	1200	-	-	223	147
El Centro (9th Street)	9.1	1	1300	-	-	89.1	79
Niland (English Rd)	22.6	344	1100	-	-	601	448
RIVERSIDE COUNTY							
Blythe Airport (KBLH)	28	340	1052	36	052/1152	487	196
Palm Springs Airport (KPSP)	26	320	053	37	053	-	493
Jacqueline Cochran Regional Airport (KTRM) - Thermal	25	360	1452	37	1452	64.3	62.2
ARIZONA - YUMA							
Yuma MCAS (KNYL)	25	350	852	37	1452	471	197
MEXICALI - MEXICO							
Mexicali Int. Airport (MXL)	23	320	1444	-	-	64.3	62.2

*All time referenced throughout this document is in Pacific Standard Time (PST) unless otherwise noted

National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory HYSPLIT back trajectory model[7], depicted in **Figure 2-20**, indicates the path of the airflow, as predominantly northerly, 24 hours prior to the Niland monitor measuring its 1100 PST peak concentration.

May 11, 2014 was a scheduled run day and although the Brawley, Calexico, El Centro, Niland and Westmorland monitors measured concentrations over 100 µg/m³, none of the stations measured an exceedance. However, one can see that all of Imperial County was affected by the gusty westerly winds on May 11, 2014. Niland, because of its location, was affected more than the other monitors because winds were predominantly from the North. As mentioned above the direction of the wind was predominately from a northern direction. North of Niland is primarily natural open desert areas with little to no population, therefore no significant urban setting to obstruct the path. Elevation however plays a significant role when winds come from the North. If surface winds are insufficient to reach the central and western sections of Imperial County then

[7] The Hybrid Single Particle Lagrangian Integrated Trajectory Model (**HYSPLIT**) is a computer model that is a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. It is currently used to compute air parcel trajectories and dispersion or deposition of atmospheric pollutants. One popular use of HYSPLIT is to establish whether high levels of air pollution at one location are caused by transport of air contaminants from another location. HYSPLIT's back trajectories, combined with satellite images (for example, from NASA's MODIS satellites), can provide insight into whether high air pollution levels are caused by local air pollution sources or whether an air pollution problem was blown in on the wind The initial development was a result of a joint effort between NOAA and Australia's Bureau of Meteorology. Source: NOAA/Air Resources Laboratory, 2011.

only outlaying monitors are affected. This was the case on May 11, 2014, and why only the Niland monitor measured an exceedance.

FIGURE 2-20
NOAA HYSPLIT TRAJECTORY ENDING AT 1900 UTC MAY 11, 2014

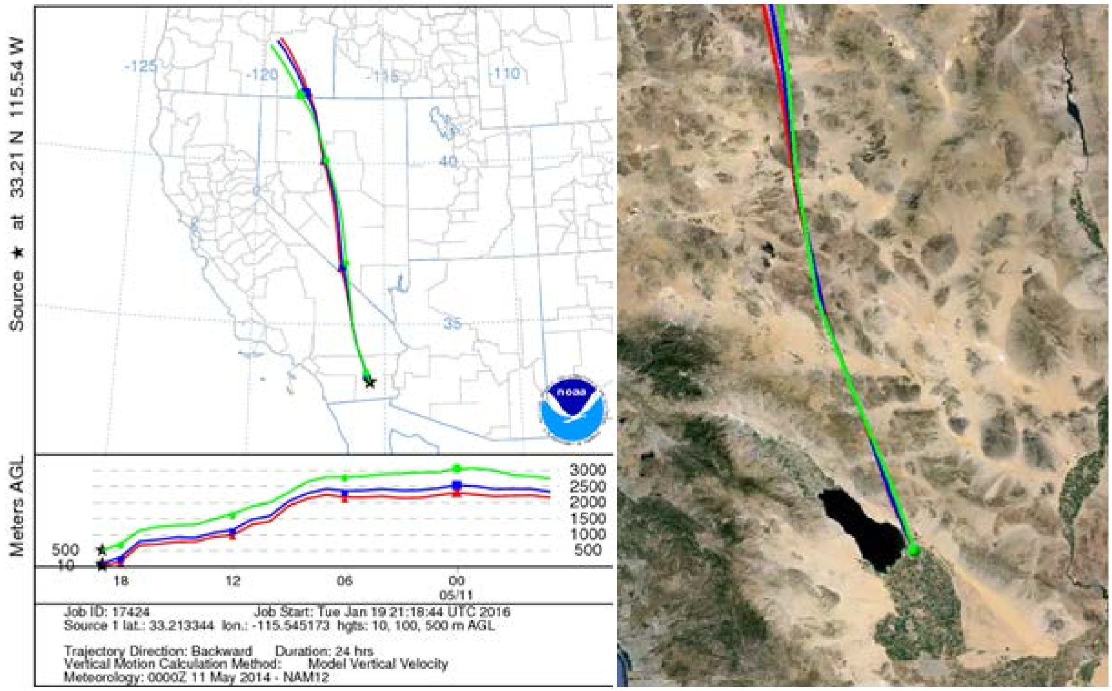

Fig 2-20: A 24-hour back trajectory ending at Niland at 1100 PST illustrates airflow over naturally open desert. Red line indicates airflow at 10 meters AGL (above ground level); blue=100 meters; green=500 meters. Generated through NOAA's Air Resources Laboratory HYSPLIT. Google Earth base map

It should be noted that modeled winds can differ from local conditions. Data used in the HYSPLIT model has a horizontal resolution of 12 km and integrated every three hours. Thus, the HYSPLIT model may differ from local observed surface wind speeds and directions.

Figure 2-21 illustrates the elevated levels of PM_{10} concentrations measured in Riverside, Imperial and Yuma Counties for a total of three days, May 10, 2014 through May 12, 2014. Elevated emissions entrained into Imperial County, as early as May 10, 2014 affected the Brawley, Calexico, El Centro, Niland and Westmorland monitors when gusty westerly winds, associated with the movement of an upper level low along the Four Corners region on May 11, 2014 causing the tightening the pressure gradient. As the weather system shifted a predominantly northwesterly flow aloft provided the ideal conditions conducive for an exceedance at the Niland monitor and not at any of the other monitors in Imperial County. The Niland monitor measured the highest elevated concentrations between 0800 PST and 1200 PST coincident with the highest measured wind speeds, Bombay Beach 28.7mph.

The resulting entrained dust and accompanying high winds from the system qualify this event as a "high wind dust event".[8] High wind dust events are considered natural events where the windblown dust is either from solely a natural source or from areas where anthropogenic sources of windblown dust are controlled with Best Available Control Measures (BACM). The following sections provide evidence that the May 11, 2014 high, wind event qualifies as a natural event and that BACM was overwhelmed by the meteorological event.

FIGURE 2-21
72 HOUR PM_{10} CONCENTRATIONS NEIGHBORING SITES

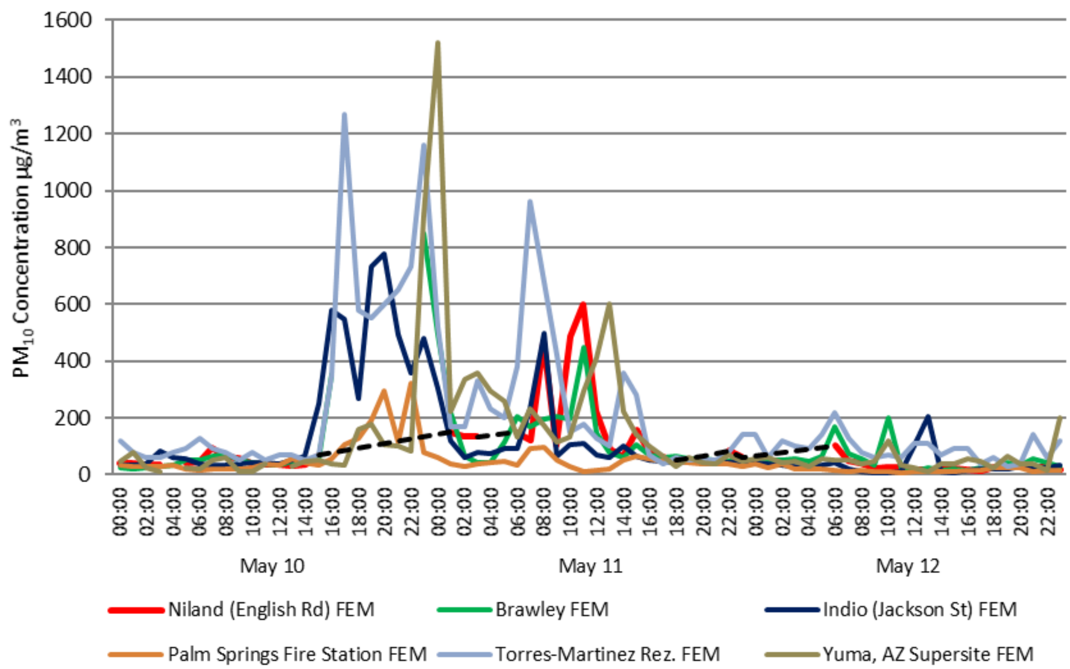

Fig 2-21: The graphical representation of 72-hour relative PM_{10} concentrations at various monitoring locations throughout Riverside, Imperial, and Yuma counties illustrate the affect upon regional monitors. Elevated PM_{10} concentrations on May 11, 2014 affected air quality in Imperial County. Air quality data from the EPA's AQS data bank

[8] Title 40 Code of Federal Regulations part 50: §50.1(p) High wind dust event is an event that includes the high-speed wind and the dust that the wind entrains and transports to a monitoring site.

III Historical Concentrations

III.1 Analysis

While naturally occurring high wind events may recur seasonally and at times frequently and qualify for exclusion under the EER, historical comparisons of the particulate concentrations and associated winds provide insight into the frequency of events within an identified area. The following time series plots illustrate that PM_{10} concentrations measured at the Brawley, Niland, and Westmorland monitors on May 11, 2014, were compared to non-event and event days demonstrating the variability over several years and seasons. The analysis, also, provides supporting evidence that there exists a clear causal relationship between the May 11, 2014 high wind event and the exceedance measured at the Niland monitor.

Figures 3-1 and 3-2 shows the time series of available FRM and BAM 24-hr PM_{10} concentrations at the Niland monitor for the period of January 1, 2010 through May 11, 2014. Note that prior to 2013, BAM data was not FEM therefore, not reported into AQS.[9] Properly establishing the variability of the event as it occurred on May 11, 2014, 24-hour averaged PM_{10} concentrations between January 1, 2010 and May 11, 2014 were compiled and plotted as a time series. All figures illustrate that the exceedance, which occurred on May 11, 2014 were outside the normal historical concentrations when compared to event and non-event days. Air quality data for all graphs was obtained through the EPA's AQS data bank.

[9] Pollutant concentration data contained in EPA's Air Quality System (AQS) are required to be reported in units corrected to standard temperature and pressure (25 C, 760 mm Hg). Because the PM_{10} concentrations prior to 2013 were not reported into the AQS database all BAM (FEM) data prior to 2013 within this report are expressed as micrograms per cubic meter (mg/m3) at local temperature and pressure (LTP) as opposed to standard temperature and pressure (STP, 760 torr and 25 C). The difference in concentration measurements between standard conditions and local conditions is insignificant and does not alter or cause any significant changes in conclusions to comparisons of PM_{10} concentrations to PM_{10} concentrations with in this demonstration.

FIGURE 3-1
NILAND HISTORICAL COMPARISON
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO MAY 11, 2014

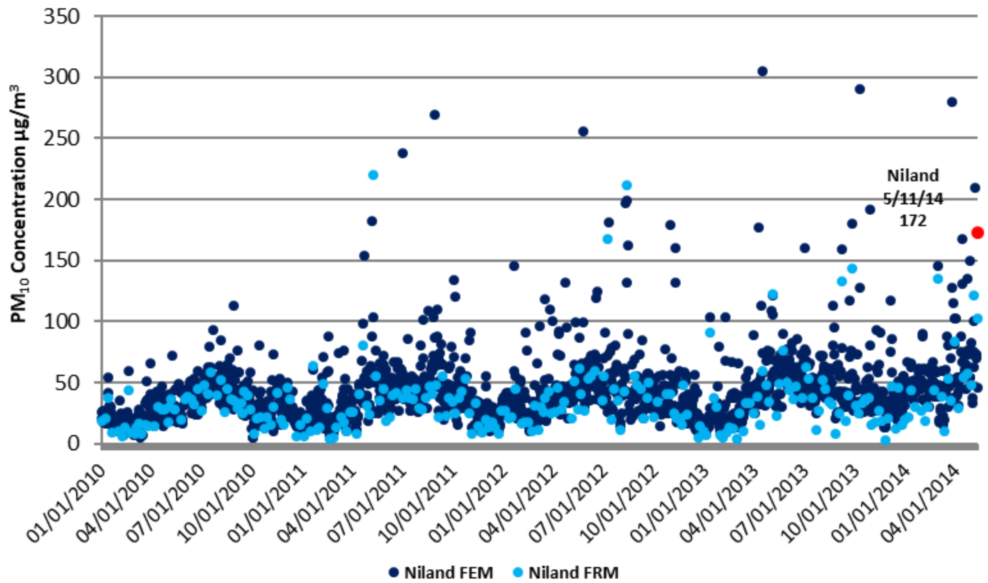

Fig 3-1: A comparison of historical PM_{10} concentrations demonstrates that the May 11, 2014 measured concentration of 172 µg/m^3 by the Niland monitor was outside the normal historical measurements. Of 1,592 sampling days, there were 23 exceedance days, which is less than a 1.5% occurrence rate

The time series, **Figure 3-1**, for Niland included 1,842 credible samples, measured between January 1, 2010 and May 11, 2014.

Overall, the time series illustrates that the Niland monitor, measured 23 exceedance days out of the 1,592 sampling days, which is less than a 1.5% occurrence rate. Of the 23 measured exceedance days, eight (8) exceedance days occurred during the second quarter (April – June). The remaining 15 exceedances were measured during the first, third, and fourth quarters. The May 11, 2014 concentration is outside the normal historical measurements for the second quarter. No exceedances of the standard occurred during 2010. As mentioned above FEM BAM data was not considered regulatory from 2010 to 2012.

FIGURE 3-2
NILAND SEASONAL COMPARISON
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
APRIL 1, 2010 THROUGH MAY 11, 2014

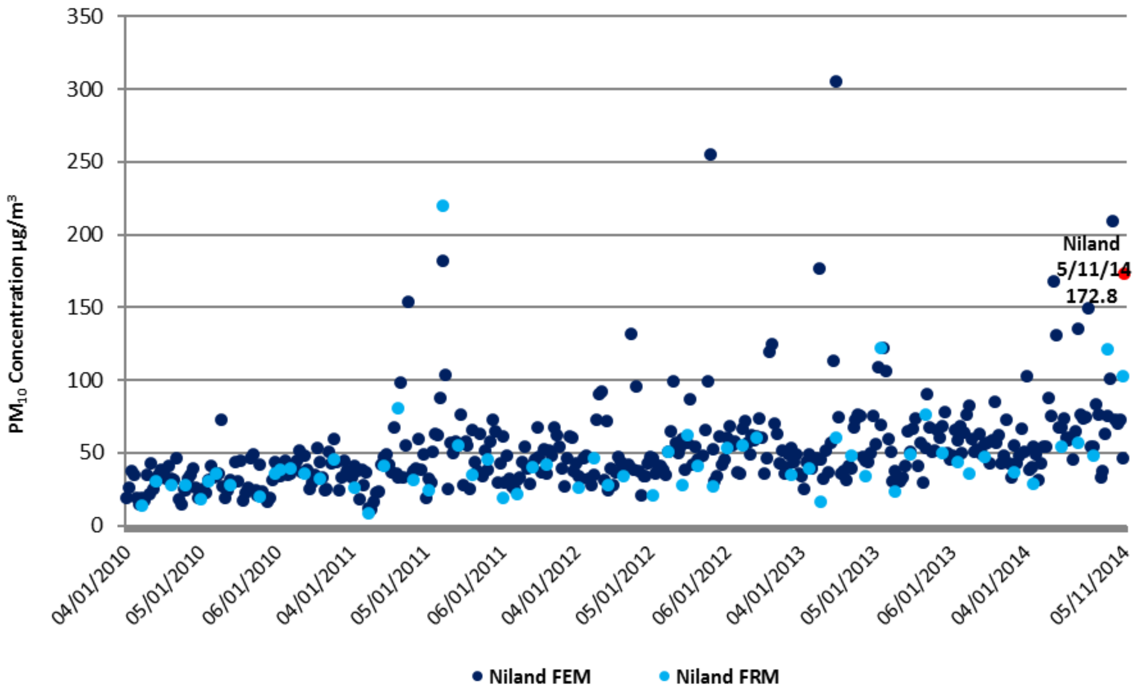

Fig 3-2: A comparison of seasonal PM_{10} concentrations demonstrates that the May 11, 2014 measured concentration of 172 µg/m^3 by the Niland monitor was outside the normal seasonal measurements. Of 405 sampling days, there were 8 exceedance days, which is less than a 2.0% occurrence rate

Figure 3-2, displays the seasonal fluctuation over 405 sampling days at the Niland monitor for second quarter (April to June) between 2010 and 2014. The Niland monitor measured 467 credible samples over 405 sampling days. Of the 405 sampling days, there were 8 measured exceedance days which equates to less than a 2% occurrence rate. The May 11, 2014 measured concentration at the Niland monitor was outside the normal historical and seasonal concentrations when compared to both event days and non-event days.

FIGURE 3-3
NILAND HISTORICAL
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO JUNE 30, 2014

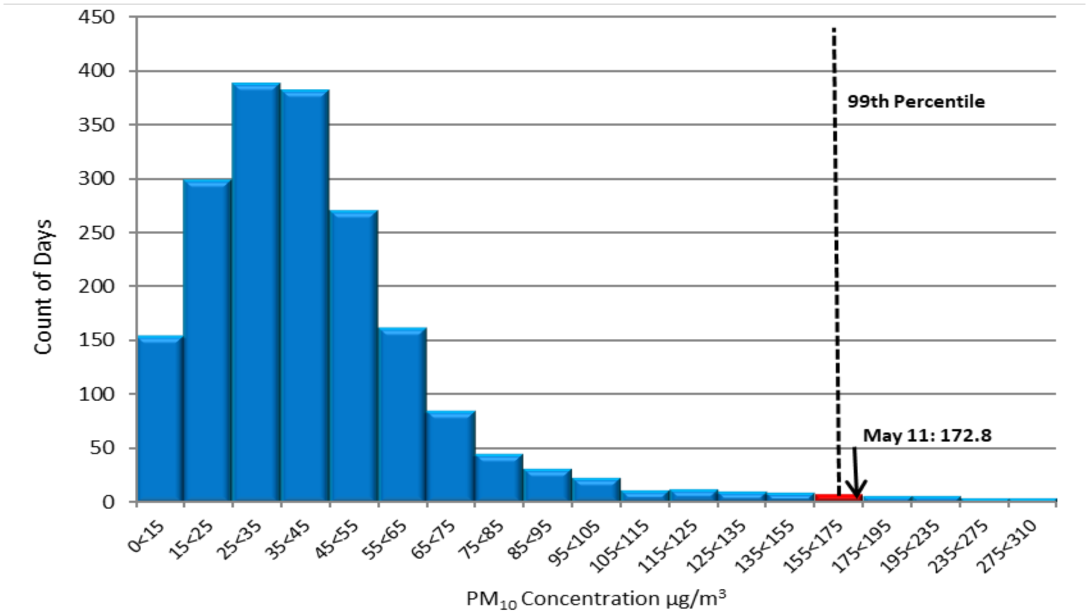

Fig 3-3: The 24-hr average PM_{10} concentrations measured at Niland monitoring site demonstrates that the May 11, 2014 event was in excess of the 99th percentile

FIGURE 3-4
NILAND SEASONAL COMPARISON
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
APRIL 1, 2010 TO JUNE 30, 2014

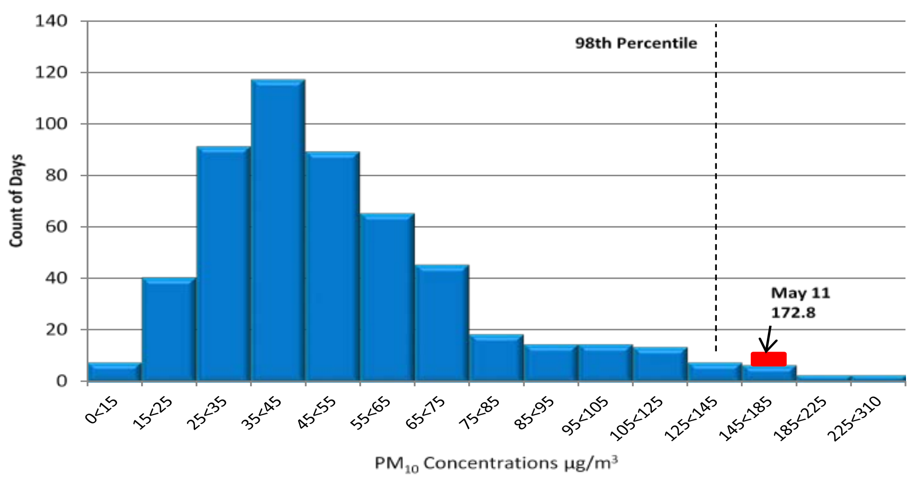

Fig 3-4: The 24-hr average PM_{10} concentration at the Niland monitoring site demonstrates that the May 11, 2014 event was in excess of the 99th percentile

For the combined FRM and FEM datasets for the Niland monitor the annual historical and the seasonal historical PM_{10} concentration of 172 µg/m^3 fell above the 98th percentile ranking. Looking at the annual time series concentrations, the seasonal time series concentrations, and the percentile rankings for both the historical and seasonal patterns the May 11, 2014 measured exceedance of 172 µg/m^3 is clearly outside the normal concentration levels when comparing to non-event days and event days.

III.2 Summary

The information provided, above, by the time series plots, seasonal time series plots, and the percentile rankings illustrate that the PM_{10} concentration observed on May 11, 2014 occurred infrequently. When comparing the measured PM_{10} levels on May 11, 2014 and following USEPA EER guidance, this demonstration provides supporting evidence that the measured exceedance measured at the Niland monitor was outside the normal historical and seasonal historical concentration levels.

The historical concentration analysis provided here supports the determination that the May 20, 2014 natural event affected the concentration level at the Niland monitor causing an exceedance. The concentration analysis further supports that the natural event affected air quality in such a way that there exists a clear causal relationship between the measured exceedance on May 11, 2014 and the natural event, qualifying the natural event as an Exceptional Event.

IV Not Reasonably Controllable or Preventable

According to the October 3, 2016 promulgated revision to the Exceptional Event (EE) rule under 40 CFR §50.14(b)(8) air agencies must address the "not reasonably controllable or preventable" (nRCP) criterion as two prongs. To address the nRCP criterion the ICAPCD must not only identify the natural and anthropogenic sources of emissions causing and contributing to the monitored exceedance but must identify the relevant State Implementation Plan (SIP) measures and/or other enforceable control measures in place for the identified sources. An effective analysis of the nRCP must include the implementation status of the control measures to consider the measures as enforceable. USEPA considers control measures enforceable if approved into the SIP within 5 years of an EE demonstration submittal. The identified control measures must address those specific sources that as causing or contributing to a monitored exceedance.

The final EE rule revision explains that an event is not reasonably controllable if reasonable measures to control the impact of the event on air quality were applied at the time of the event. Similarly, an event is not reasonably preventable if reasonable measures to prevent the event were applied at the time of the event. However, for "high wind events" when PM_{10} concentrations are due to dust raised by high winds from desert areas whose sources are controlled with Best Available Control Measures (BACM) then the event is a "natural event" where human activity plays little or no direct causal role and thus is considered not preventable.

This section begins by providing background information on all SIP and other enforceable control measures in force during the EE for May 11, 2014. In addition, this May 11, 2014 demonstration provides technical and non-technical evidence that strong gusty westerly winds blew across the mountains and deserts within southeastern California and into Imperial County suspending particulate matter affecting the Niland monitor on May 11, 2014. This section identifies all natural and anthropogenic sources and provides regulatory evidence of the enforceability of the control measures in place during the May 11, 2014 EE.

IV.1 Background

Inhalable particulate matter (PM_{10}) contributes to effects that are harmful to human health and the environment, including premature mortality, aggravation of respiratory and cardiovascular disease, decreased lung function, visibility impairment, and damage to vegetation and ecosystems. Upon enactment of the 1990 Clean Air Act (CAA) amendments, Imperial County was classified as moderate nonattainment for the PM_{10} NAAQS under CAA sections 107(d)(4)(B) and 188(a). By November 15, 1991, such areas were required to develop and submit State Implementation Plan (SIP) revisions providing for, among other things, implementation of reasonably available control measures (RACM).

Partly to address the RACM requirement, ICAPCD adopted local Regulation VIII rules to control PM_{10} from sources of fugitive dust on October 10, 1994, and revised them on November 25, 1996. USEPA did not act on these versions of the rules with respect to the federally enforceable SIP.
On August 11, 2004, USEPA reclassified Imperial County as a serious nonattainment area for

PM_{10}. As a result, CAA section 189(b)(1)(B) required all BACM to be implemented in the area within four years of the effective date of the reclassification, i.e., by September 10, 2008.

On November 8, 2005, partly to address the BACM requirement, ICAPCD revised the Regulation VIII rules to strengthen fugitive dust requirements. On July 8, 2010, USEPA finalized a limited approval of the 2005 version of Regulation VIII, finding that the seven Regulation VIII rules largely fulfilled the relevant CAA requirements. Simultaneously, USEPA also finalized a limited disapproval of several of the rules, identifying specific deficiencies that needed to be addressed to fully demonstrate compliance with CAA requirements regarding BACM and enforceability.

In September 2010, ICAPCD and the California Department of Parks and Recreation (DPR) filed petitions with the Ninth Circuit Federal Court of Appeals for review of USEPA's limited disapproval of the rules. After hearing oral argument on February 15, 2012, the Ninth Circuit directed the parties to consider mediation before rendering a decision on the litigation. On July 27, 2012, ICAPCD, DPR and USEPA reached agreement on a resolution to the dispute which included a set of specific revisions to Regulation VIII. These revisions are reflected in the version of Regulation VIII adopted by ICAPCD on October 16, 2012 and approved by USEPA April 22, 2013. Since 2006 ICAPCD had implemented regulatory measures to control emissions from fugitive dust sources and open burning in Imperial County.

FIGURE 4-1
REGULATION VIII GRAPHIC TIMELINE DEVELOPMENT

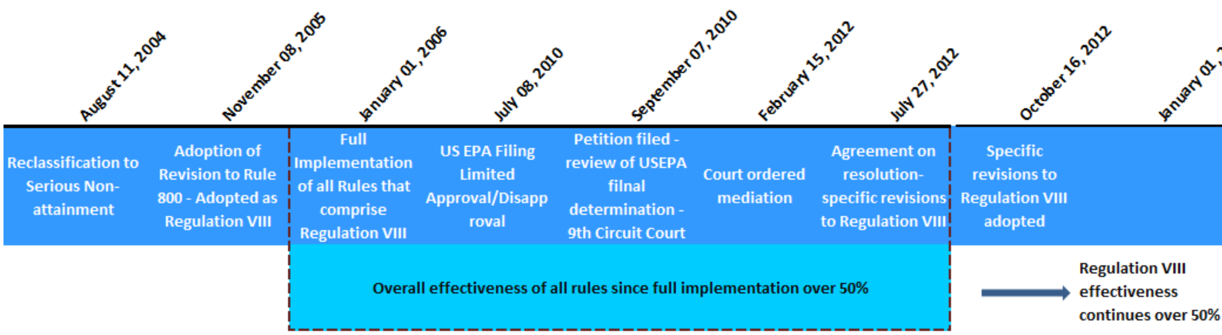

Fig 4-1: Regulation VIII Graphic Timeline

IV.1.a Control Measures

A brief summary of Regulation VIII which is comprised of seven fugitive dust rules is found below. **Appendix D** contains a complete set of the Regulation VIII rules.

ICAPCD's Regulation VIII consists of seven interrelated rules designed to limit emissions of PM_{10} from anthropogenic fugitive dust sources in Imperial County.

<u>Rule 800, General Requirements for Control of Fine Particulate Matter</u>, provides definitions, a compliance schedule, exemptions and other requirements generally applicable to all seven rules. It requires the United States Bureau of Land Management (BLM), United States Border Patrol

(BP) and DPR to submit dust control plans (DCP) to mitigate fugitive dust from areas and/or activities under their control. Appendices A and B within Rule 800 describe methods for determining compliance with opacity and surface stabilization requirements in Rules 801 through 806.

Rule 801, Construction and Earthmoving Activities, establishes a 20% opacity limit and control requirements for construction and earthmoving activities. Affected sources must submit a DCP and comply with other portions of Regulation VIII regarding bulk materials, carry-out and track-out, and paved and unpaved roads. The rule exempts single family homes and waives the 20% opacity limit in winds over 25 mph under certain conditions.

Rule 802, Bulk Materials, establishes a 20% opacity limit and other requirements to control dust from bulk material handling, storage, transport and hauling.

Rule 803, Carry-Out and Track-Out, establishes requirements to prevent and clean-up mud and dirt transported onto paved roads from unpaved roads and areas.

Rule 804, Open Areas, establishes a 20% opacity limit and requires land owners to prevent vehicular trespass and stabilize disturbed soil on open areas larger than 0.5 acres in urban areas, and larger than three acres in rural areas. Agricultural operations are exempted.

Rule 805, Paved and Unpaved Roads, establishes a 20% opacity limit and control requirements for unpaved haul and access roads, canal roads and traffic areas that meet certain size or traffic thresholds. It also prohibits construction of new unpaved roads in certain circumstances. Single-family residences and agricultural operations are exempted.

Rule 806, Conservation Management Practices, requires agricultural operation sites greater than 40 acres to implement at least one conservation management practice (CMP) for each of several activities that often generate dust at agricultural operations. In addition, agricultural operation sites must prepare a CMP plan describing how they comply with Rule 806, and must make the CMP plan available to the ICAPCD upon request.

IV.1.b Additional Measures

Imperial County Natural Events Action Plan (NEAP)

On August 2005, the ICAPCD adopted a NEAP for the Imperial County, as was required under the former USEPA Natural Events Policy, to address PM_{10} events by:

- Protecting public health;
- Educating the public about high wind events;
- Mitigating health impacts on the community during future events; and
- Identifying and implementing BACM measures for anthropogenic sources of windblown dust.

Smoke Management Plan (SMP) Summary

There are 35 Air Pollution Control Districts or Air Quality Management Districts in California which are required to implement a district-wide smoke management program. The regulatory basis for California's Smoke Management Program, codified under Title 17 of the California Code of Regulations is the "Smoke Management Guidelines for Agricultural and Prescribed Burning" (Guidelines). California's 1987 Guidelines were revised to improve interagency coordination, avoid smoke episodes, and provide continued public safety while providing adequate opportunity for necessary open burning. The revisions to the 1987 Guidelines were approved March 14, 2001. All air districts, with the exception of the San Joaquin Valley Air Pollution Control District (SJAPCD) were required to update their existing rules and Smoke Management Plans to conform to the most recent update to the Guidelines.

Section 80150 of Title 17 specifies the special requirements for open burning in agricultural operations, the growing of crops and the raising of fowl or animals. This section specifically requires the ICAPCD to have rules and regulations that require permits that contain requirements that minimize smoke impacts from agricultural burning.

On a daily basis, the ICAPCD reviews surface meteorological reports from various airport agencies, the NWS, State fire agencies and CARB to help determine whether the day is a burn day. Using a four quadrant map of Imperial County allowed burns are allocated in such a manner as to assure minimal to no smoke impacts safeguarding the public health. Finally, all permit holders are required to notice and advise members of the public of a potential burn. This noticing requirement is known as the Good Neighbor Policy. On May 11, 2014 the ICAPCD declared a No Burn day **(Appendix A).** No complaints were filed for agricultural burning on May 11, 2014.

IV.1.c Review of Source-Permitted Inspections and Public Complaints

A query of the ICAPCD permit database was compiled and reviewed for active permitted sources throughout Imperial County and specifically around Niland during the May 11, 2014 PM_{10} exceedance. Both permitted and non-permitted sources are required to comply with Regulation VIII requirements that address fugitive dust emissions. The identified permitted sources are Aggregate Products, Inc., US Gypsum Quarry, Imperial Aggregates (Val-Rock, Inc., and Granite Construction), US Gypsum Plaster City, Clean Harbors (Laidlaw Environmental Services), Bullfrog Farms (Dairy), Burrtec Waste Industries, Border Patrol Inspection station, Centinela State Prison, various communications towers not listed and various agricultural operations. Non-permitted sources include the wind farm known as Ocotillo Express, and a solar facility known as CSolar IV West. Finally, the desert regions are under the jurisdiction of the Bureau of Land Management and the California Department of Parks (Including Anza Borrego State Park and Ocotillo Wells).

An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions. There were no complaints filed on May 11, 2014, officially declared as a No Burn day, related to agricultural burning, waste burning or dust.

FIGURE 4-2
PERMITTED SOURCES

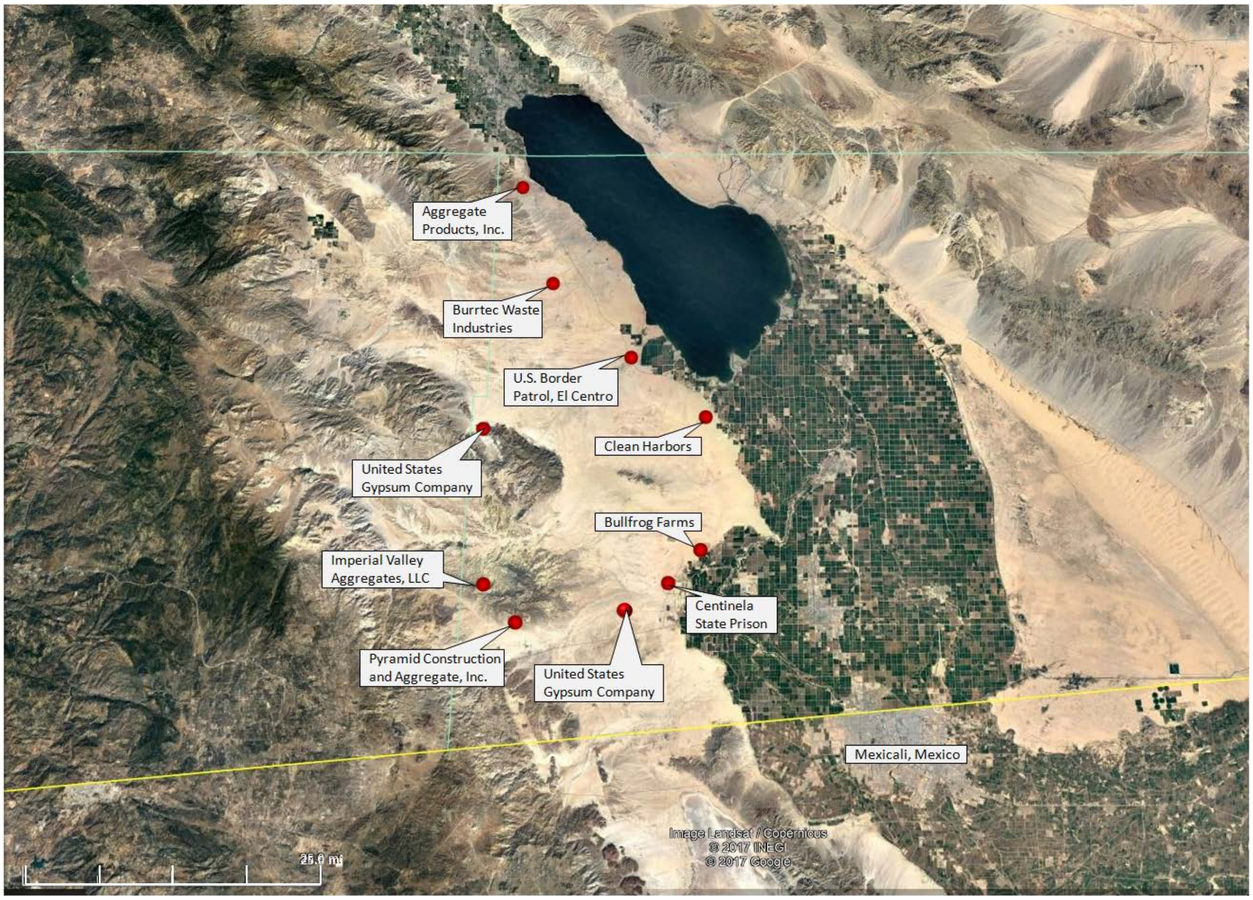

Fig 4-2: The above map identifies those permitted sources located west, northwest and southwest of the Niland monitor. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the United States and Mexico. The green checker-boarded areas are a mixed use of agricultural and community parcels. In addition, either the Bureau of Land Management or the California Department of Parks manages the desert areas. Base map from Google Earth

FIGURE 4-3
NON-PERMITTED SOURCES

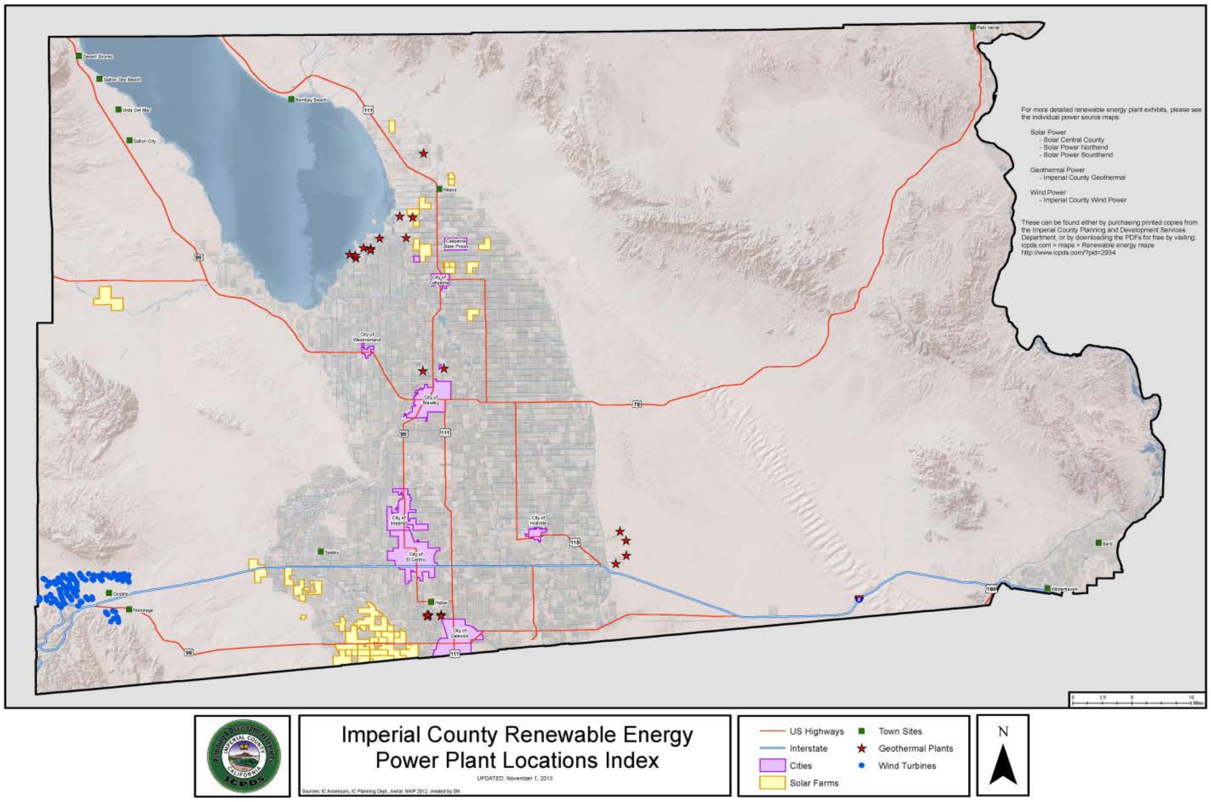

Fig 4-3: The above map identifies those power sources located west, northwest and southwest of the Niland monitor. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

IV.2 Forecasts and Warnings

As mentioned above the ICAPCD and the National Weather Service (NWS) provided notification via the ICAPCD's webpage that winds 20 to 30 mph and gust to 45 miles per hour (mph) could affect this region, potentially elevating particulate matter. In addition, the San Diego and Phoenix NWS offices issued Urgent Weather Messages and Hazardous Weather Outlooks containing wind advisories and blowing dust advisories.

Wind advisories are issued by the NWS when winds of 30 to 39 mph are expected for one (1) hour or longer.[10] At 0244 PST on May 10, 2014 the NWS Phoenix office issued a Hazardous Weather Outlook for Imperial County that included a Wind Advisory effective from 6 p.m. to 10 p.m. that evening. At 1311 PST a second Wind Advisory was issued effective 0800 PST through 1700 PST. May 11, 2014. The advisories warned of the potential for wind speeds of between 20

[10] A wind advisory is issued when the following conditions are met for one (1) hour or longer: 1) sustained winds of 31 to 39 mph, and/or; 2) wind gusts of 46 to 57 mph for any duration. Source: NWS, 2016; http://www.weather.gov/lwx/WarningsDefined#WindAdvisory

and 30 mph, wind gusts of up to 45 mph. On May 11, 2014 at 1126 PST a Blowing Dust Advisory was issued for a wide area extending from eastern Riverside County, all of Imperial County, and eastward to the lower Colorado River valley and portions of the west-central deserts in Arizona. **Appendix A** contains copies of the NWS forecasts and advisories on May 11, 2014.

IV.3 Wind Observations

Wind data during the event were available from airports in eastern Riverside County, southeastern San Diego County, southwestern Yuma County (Arizona), and Imperial County. Imperial County Airport (KIPL), Niland (English Rd), Palm Springs Airport, Jacqueline Cochran Airport, and Blythe Airport all measured wind gusts of at least 35 mph. Niland also measured several hours of winds at or above the 25 mph threshold on May 10, 2014. Wind speeds of over 25 mph are normally sufficient to overcome most PM_{10} control measures. On both May 10, 2014 and May 11, 2014, wind speeds were above the 25 mph threshold overcoming the BACM in place.

IV.4 Summary

The weather and air quality forecasts and warnings outlined in this section demonstrate that dust lofted and transported by strong Santa Ana-like winds associated with a dry cold front and low-pressure system moved through southern California and caused uncontrollable PM_{10} emissions. The BACM list as part of the control measures in Imperial County for fugitive dust emissions were in place at the time of the event. These control measures are required for areas designated as "serious" non-attainment for PM_{10}, such as Imperial County. Thus, the BACM in place at the time of the event were beyond reasonable. In addition, surface wind measurements during the event were high enough (Imperial County Airport was at or above 25 mph, with gusts over 35 mph) that BACM PM_{10} control measures would have been overwhelmed.

Finally, a high wind dust event can be considered as a natural event, even when portions of the wind-driven emissions are anthropogenic, as long as those emissions have a clear causal relationship to the event and were determined to be not reasonably controllable or preventable. This demonstration has shown that the event that occurred on May 11, 2014 was not reasonably controllable or preventable despite the strong and in force BACM within the affected areas in Imperial County. This demonstration has similarly established a clear causal relationship between the exceedance and the high wind event timeline and geographic location. The May 11, 2014 event can be considered an exceptional event under the requirements of the exceptional event rule.

V Clear Causal Relationship

V.1 Discussion

Meteorological observations for May 11, 2014, identified a dry cold front that passed through southern California during the afternoon of May 10, 2014. The system departed the area on May 11, 2014. A tightening of the pressure gradient resulted when the low-pressure system intensified over southern Nevada (**Figure 5-1**). This resulted in gusty winds over much of southern California eastward to portions of western Arizona.

Entrained windblown dust from natural areas, particularly from the desert area and anthropogenic sources controlled with BACM, is confirmed by the meteorological and air quality observations on May 11, 2014. The gusty northerly winds moved across the barren soils of the high desert to the north of Imperial County, and were responsible for the exceptional event that affected the Niland monitor on May 11, 2014. The meteorological event brought high winds exceeding 35 mph to a wide area affecting a large portion of southern California, including the Imperial County.

Figures 5-1 through 5-4 provide information regarding the exceptional event that occurred May 11, 2014.

FIGURE 5-1
GOES-W INFRARED SATELLITE IMAGES MAY 10, 2014 AND MAY 11, 2014

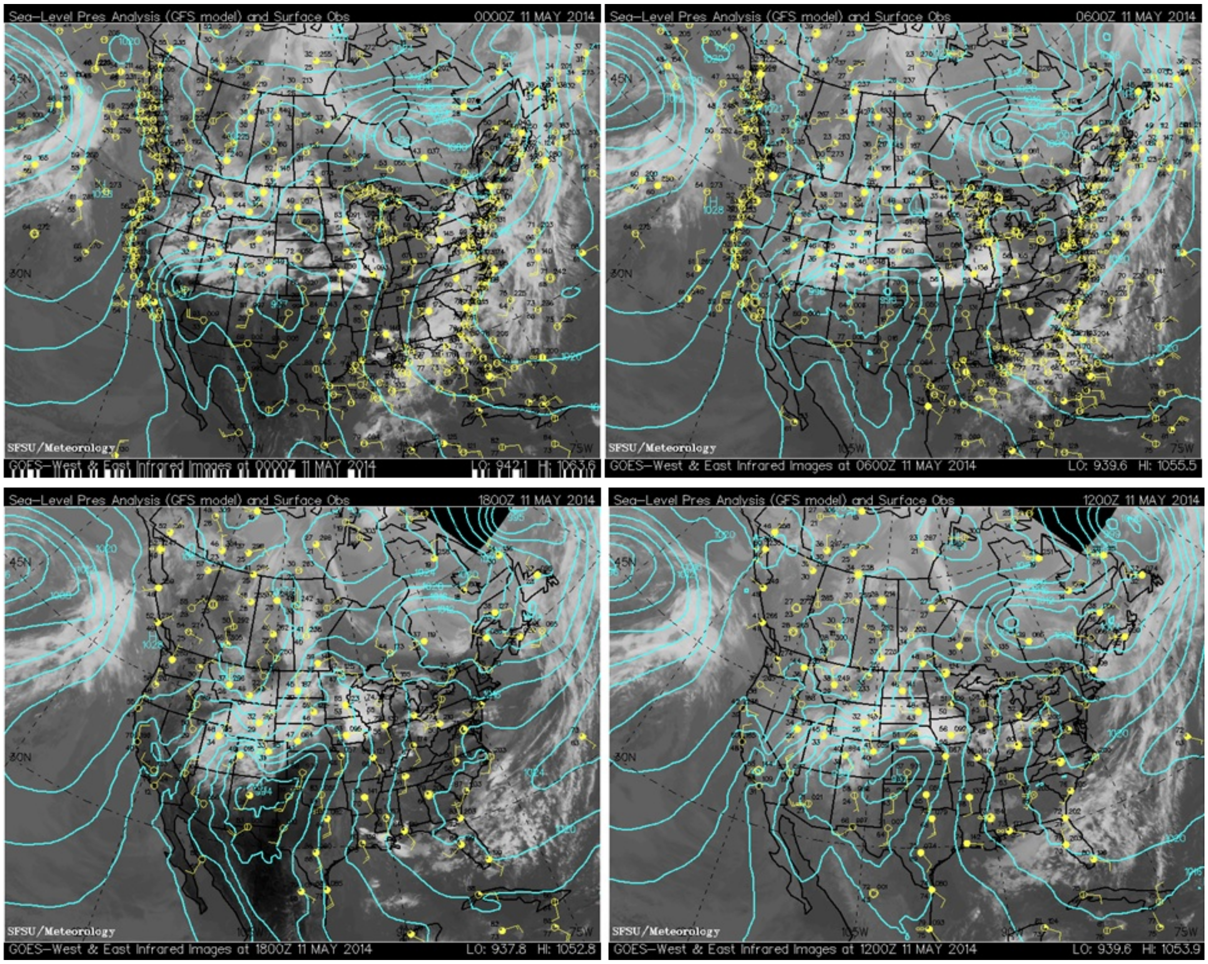

Fig 5-1: GOES-W infrared composite satellite images. Clockwise from top left: 1600 PST May 10, 2014; 2200 PST May 10, 2014; 0400 PST May 11, 2014; 1000 PST May 11, 2014. Source: SFSU Department of Earth & Climate Sciences

FIGURE 5-2
MODIS SATELLITE DUST CLOUDS IMAGES MAY 11, 2014

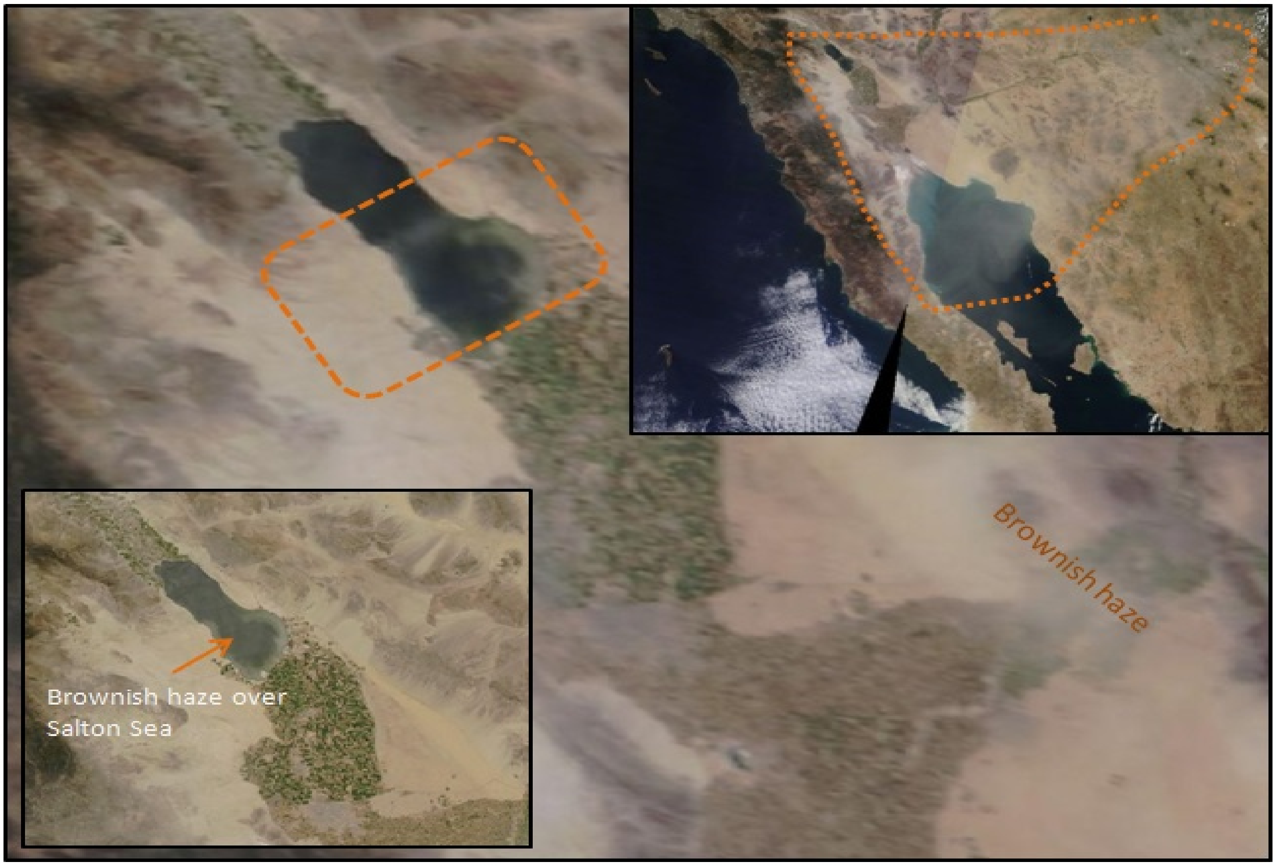

Fig 5-2: A collage of MODIS Terra and Aqua satellite images show dust drifting over a wide region of southeast California and the northern portion of the Gulf of California. Images through AirNow Tech Navigator

Base velocity radar data captured by the Yuma, Arizona station (KYUX) provides a general view of the intensity of the winds that swept through Imperial County from a northwesterly direction on May 11, 2014. The orange icons in **Figure 5-3** represent wind speeds from Niland.

FIGURE 5-3
NEXRAD BASE VELOCITY MAY 11, 2014

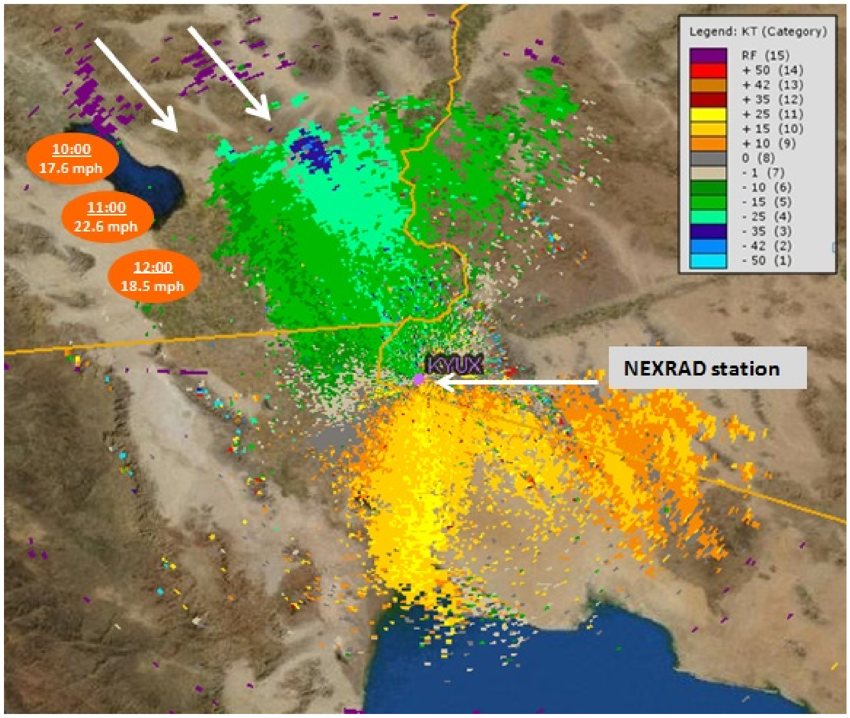

Fig 5-3: A NEXRAD base velocity image captured by the Yuma, Arizona (KYUX) station at 1129 PST on May 11, 2014 (base image) during the hour of peak PM_{10} concentration. Cooler colors on the base velocity image (greens and blues) indicate general wind direction towards the radar site (KYUX). Warmer colors (yellow, orange, and red) indicate general wind direction away from the radar site. Yellow colors indicate wind speeds ~28 mph. Lighter greens indicate a converse wind speed as the winds moved from a general northwest-southeast direction. Orange icons indicate wind speed at the given hour taken from the Niland monitor. Image generated through NOAA's Weather and Climate Toolkit

Figure 5-4 is a graphical representation of the meteorological elements on May 11, 2014. Winds measured at Niland show prevailing winds were trending westerly by 2100 PST on May 10, 2014. Two consecutive hours with winds of 30.4 mph and 30.8 mph were measured during the 1900 PST and 2000 PST hours, respectively. The strong winds continued through May 11, 2014. However, between the hours of 0200 PST and 0300 PST on May 11, 2014 winds shifted from ~270 to ~315 degrees. After a temporary lull, winds increased. Prevailing winds remained from the ~northwest until 1900 PST the evening of May 11, 2014. Prevailing strong winds on May 11, 2014 peaked at 22.6 at the Niland station. Upwind sites within Riverside County measured strong winds. The Twenty-nine Palms Airport (KNTP), directly upwind from Niland measured gusts from the northwest at 32.2.

As noted in **Table 5-1**, upwind sites at Dos Palms on the north shore of the Salton Sea, measured two consecutive hours of gusts 39 mph. Starting at 0314 PST, Dos Palmas measured nine out of 10 hours with gusts over 30 mph. Bombay Beach, also on the north shore of the Salton Sea and upwind from Niland, measured two consecutive hours of winds over 25 mph (28.7 and 26.0 mph), between the hours of 0900 PST and 1000 PST, respectively. Imperial County Airport (KIPL) measured 30 mph winds and gusts of 38 mph during the 1100 PST hour on May 11, 2014. From 0700 PST through 1000 PST, measured winds of 21, 20, 20, and 21 mph, with accompanying gusts of 28, 30, 30, 31, and 38 mph, during those hours, respectively.

Over the course of the morning and rest of the day, winds in excess of 25 mph were measured at a number of NWS stations**.** Several stations, including the Blythe Airport (KBLH) and Palm Springs International Airport in Riverside County, the Imperial County Airport (KIPL), and Yuma Supersite in Yuma, Arizona, all measured wind gusts over 35 mph. Winds diminish during late evening on May 11, 2014.

FIGURE 5-4
WIND DYNAMICS MAY 11, 2014

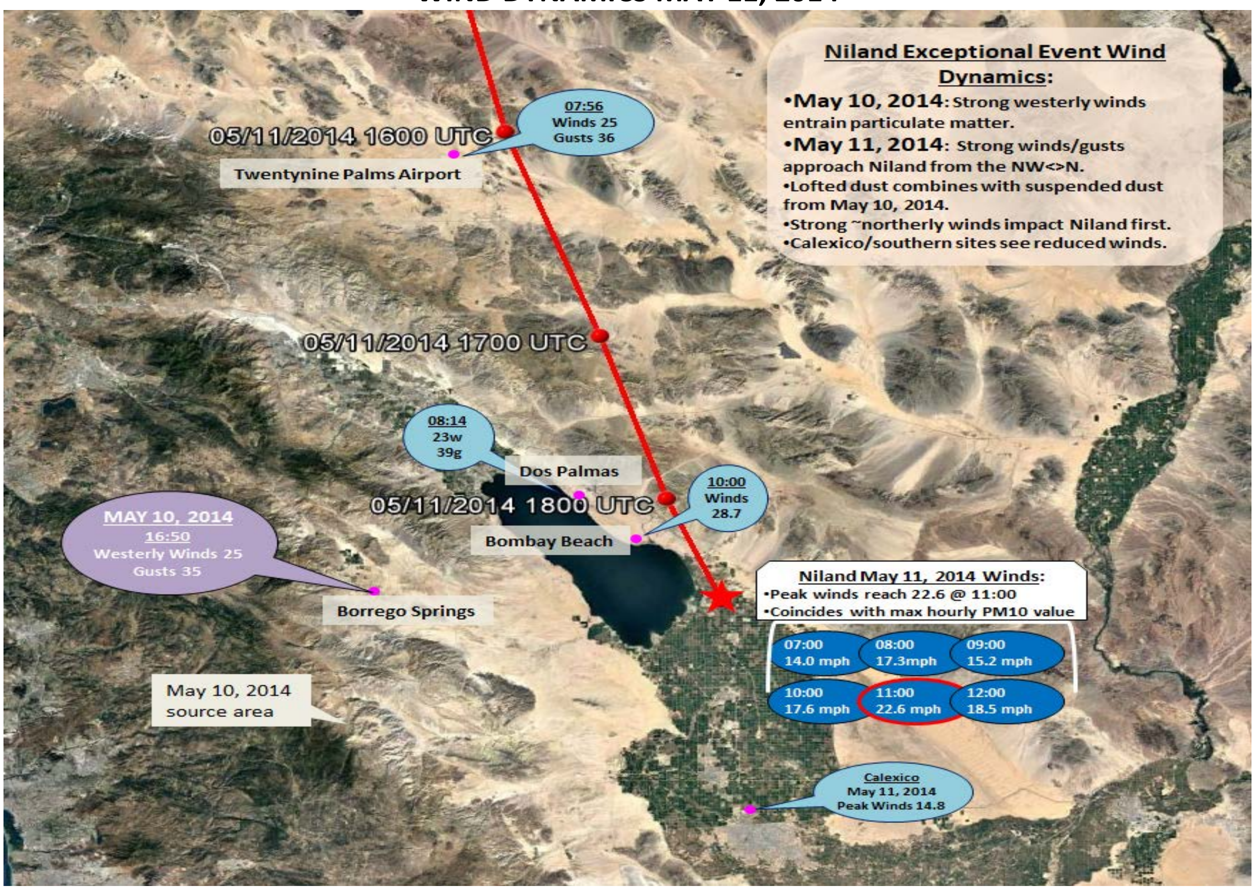

Fig 5-4: Is a graphical representation of the key wind dynamics during the May 11, 2014, exceedance at Niland station. Transported windblown dust by gusty winds began as early as the afternoon of May 10, 2014 which mixed when gusty winds swept southward over dry, mostly natural open desert soils NW to NNW of Niland. The graphic includes a HYSPLIT back-trajectory ending the hour of the measured peak PM_{10} concentration at the Niland monitor. The red line depicts airflow at 10 meters. Times given are for (from top down): 0800 PST; 0900 PST; and 1000 PST on May 11, 2014

The EPA accepts a high wind threshold for sustained winds of 25 mph in California and 12 other states.[11] **Table 5-1** provides a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM_{10} concentrations at the exceeding station on May 11, 2014. The table shows that peak hourly concentrations took place immediately following or during the period of high upstream wind speeds.

TABLE 5-1

WIND SPEEDS AND PM_{10} CONCENTRATIONS FOR NILAND MAY 11, 2014

TWENTYNINE PALMS				DOS PALMAS				BOMBAY BEACH				IMPERIAL COUNTY AIRPORT				NILAND FEM	
																	5/11/2014
HOUR	W/S	W/G	W/D	HOUR	W/S	W/G	W/D	HOUR	W/S	W/G	W/D	HOUR	W/S	W/G	W/D	HOUR	PM_{10} ($\mu g/m^3$)
0:00	26	38	310	0:00	11	25	347	0:00	18		286	0:00	13		290	0:00	149
1:00	24	33	290	1:00	13	28	338	1:00	12		297	1:00	14		290	1:00	135
2:00	16	24	290	2:00	16	29	324	2:00	16		304	2:00	9		270	2:00	133
3:00	20	30	290	3:00	18	36	340	3:00	14		312	3:00	6		270	3:00	
4:00	20		290	4:00	20	35	344	4:00	17		326	4:00	7		280	4:00	
5:00	17		290	5:00	17	35	330	5:00	16		326	5:00	7		270	5:00	149
6:00	24	30	340	6:00	17	28	327	6:00	21		328	6:00	10		340	6:00	119
7:00	25	36	350	7:00	16	39	346	7:00	25		341	7:00	21	28	340	7:00	470
8:00	25	32	330	8:00	23	39	343	8:00	27		327	8:00	20	30	360	8:00	105
9:00	24	34	350	9:00	21	33	337	9:00	25		335	9:00	20	30	340	9:00	487
10:00	18	33	330	10:00	17	38	344	10:00	29		348	10:00	21	31	330	10:00	601
11:00	25	32	330	11:00	19	33	333	11:00	26		328	11:00	30	38	340	11:00	223
12:00	23	31	340	12:00	15	30	346	12:00	15		353	12:00	21	29	350	12:00	89
13:00	22	29	350	13:00	14	25	342	13:00	15		313	13:00	18		330	13:00	64
14:00	16	25	360	14:00	13	28	333	14:00	19		353	14:00	16	25	350	14:00	155
15:00	14	28	350	15:00	10	29	344	15:00	21		11	15:00	17		340	15:00	75
16:00	15	26	340	16:00	13	30	13	16:00	19		357	16:00	17		360	16:00	62
17:00	13		300	17:00	11	28	332	17:00	13		346	17:00	14		20	17:00	50
18:00	13		280	18:00	9	20	348	18:00	9		319	18:00	8		350	18:00	
19:00	14		280	19:00	6	15	311	19:00	9		297	19:00	6		340	19:00	64
20:00			0	20:00	4	7	317	20:00	8		293	20:00	6		330	20:00	
21:00			0	21:00	5	6	323	21:00	7		294	21:00	6		240	21:00	84
22:00	9		320	22:00	5	7	341	22:00	3		327	22:00	7		240	22:00	61
23:00	7		300	23:00	0	7		23:00	4		38	23:00	3		VR	23:00	

Table 5-1: Wind speed, wind gust, and wind direction tables for Twenty-Nine Palms Airport, Dos Palmas, Bombay Beach and Imperial County Airport comparative to the concentration of the Niland FEM Monitor on May 11, 2014. Values indicated in red are wind speed values coincident with the Brawley FEM Monitor measured PM_{10} concentrations above 100 $\mu g/m^3$. Collected meteorological observations are from a variety of sources with varying equipment and exposure. **Appendix B** contains additional information regarding meteorological observations. "s" flag represents suspect data. "VR" flag represents variable data

[11] "Treatment of Data Influenced by Exceptional Events; Final Guidance", FR Vol. 81, No. 191, 68279, October 3, 2016

Additional evidence of blowing dust is provided by NOAA's Satellite and Information Services Smoke Text Product (**Appendix A**). On May 10, 2014 (0130Z May 11, 2014) satellites captured "numerous areas of blowing dust originat[ing] in southern California with the dust moving to the east." Anza-Borrego Desert State Park, on the western edge of Imperial County, was one of the areas identified as a "significant" source area of blowing dust. Additionally, the notice identified "an area of blowing dust sweeping southward through southern Nevada behind a strong frontal boundary" as another cause for the large amounts of suspended dust moving southward over Imperial County. **Appendix A** contains copies of pertinent notices such as the Smoke Text product.

Figure 5-5 is an illustration of the wind speeds[12] throughout southeastern California, southwestern Arizona, and northern Mexico over 72 hours. The consistency for all stations is evident. For May 10, 2014, all stations measured elevated wind speeds beginning around 15:00. Wind speeds are elevated throughout the day on May 11, 2014 as the system continued moving into the region. By the late evening hours of May 11, 2014 wind diminished.

FIGURE 5-5
72 HOUR WIND COMPARISON OF NEIGHBORING SITES

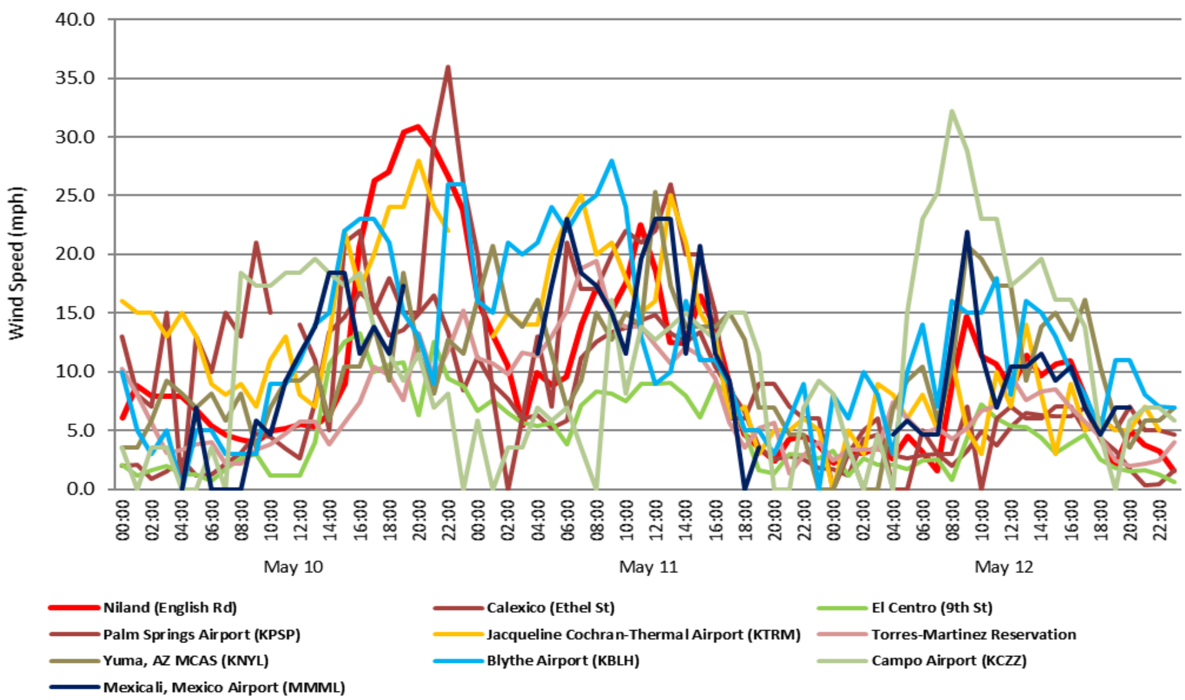

Fig 5-5: Meteorological data collected from nine regional sites over a three-day period from May 10, 2014 to May 12, 2014 shows a uniform spike in wind speed during the May 11, 2014 exceptional event. Wind data from the NCEI's QCLCD data bank; the Weather Underground, and; the EPA's AQS data bank

[12] National Weather Service; NOAA's Glossary – Wind Speed: The rate at which air is moving horizontally past a given point. It may be a 2-minute average speed (reported as wind speed) or an instantaneous speed (reported as a peak wind speed, wind gust, or squall); http://w1.weather.gov/glossary/index.php?letter=w

Figures 5-6 and 5-7 demonstrates the relationship between the high winds and the hourly PM_{10} concentrations at the Niland monitor. The correlation of hourly concentration data from the Niland monitor and the elevated wind speeds on May 11, 2014 indicates that as wind speeds increased so did concentrations.[13] The peak hourly PM_{10} concentrations at Niland occurred during the 0800 PST through 1200 PST hour, coincident with the peak measured winds at the station. **Appendix C** contains additional graphs illustrating the relationship between the high PM_{10} concentrations and increased wind speeds at other monitoring sites within Imperial, Riverside, and Yuma (Arizona) counties on May 11, 2014.

FIGURE 5-6
NILAND PM_{10} CONCENTRATION AND WIND SPEEDS

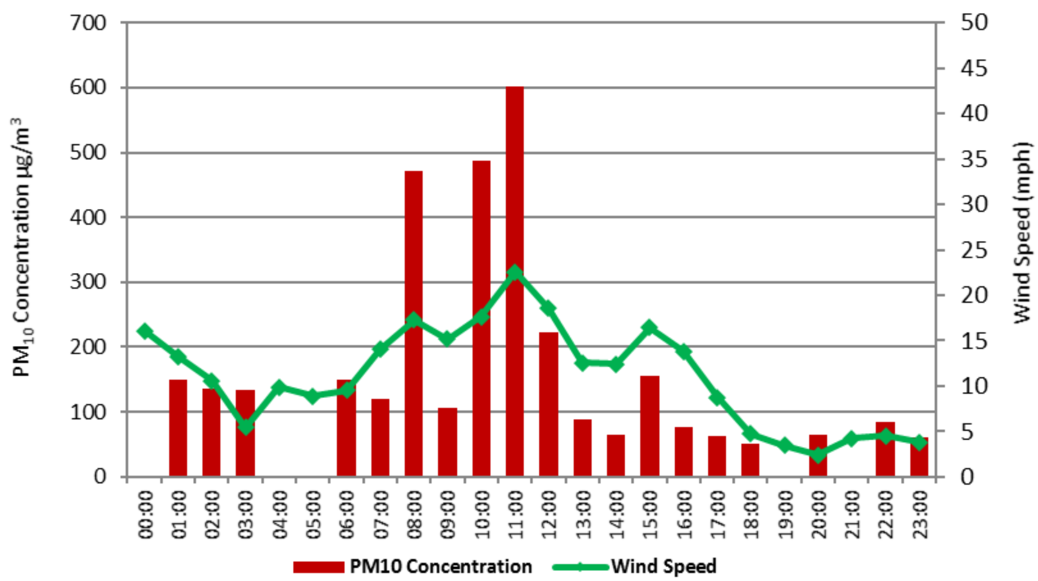

Fig 5-6: The graph illustrates the correlation of the Niland PM_{10} concentrations and gusty winds. Niland station wind data utilized. Data gaps represent instrument malfunctions. Air quality and wind data from the EPA's AQS data bank

Figure 5-7 is a three-day depiction of the PM_{10} concentrations for the Niland monitor. For the morning and early afternoon hours on May 10, 2014, the Niland monitor measured lower level concentrations as winds are light. However, on May 11, 2014, as gusty winds arrive at the station, hourly concentrations subsequently increase starting 0800 PST.

[13] Data gaps for May 10, 2014 from 1600 hrs to 00 hrs on May 11, 2014 indicated that the sample value exceeded the instrument limits while the remaining data gaps for May 11, 2014 indicated the sample flow rate out of limits. In all cases, the instrument failed to meet critical criteria requirements.

FIGURE 5-7
72 HOUR PM_{10} CONCENTRATIONS AND WIND SPEEDS

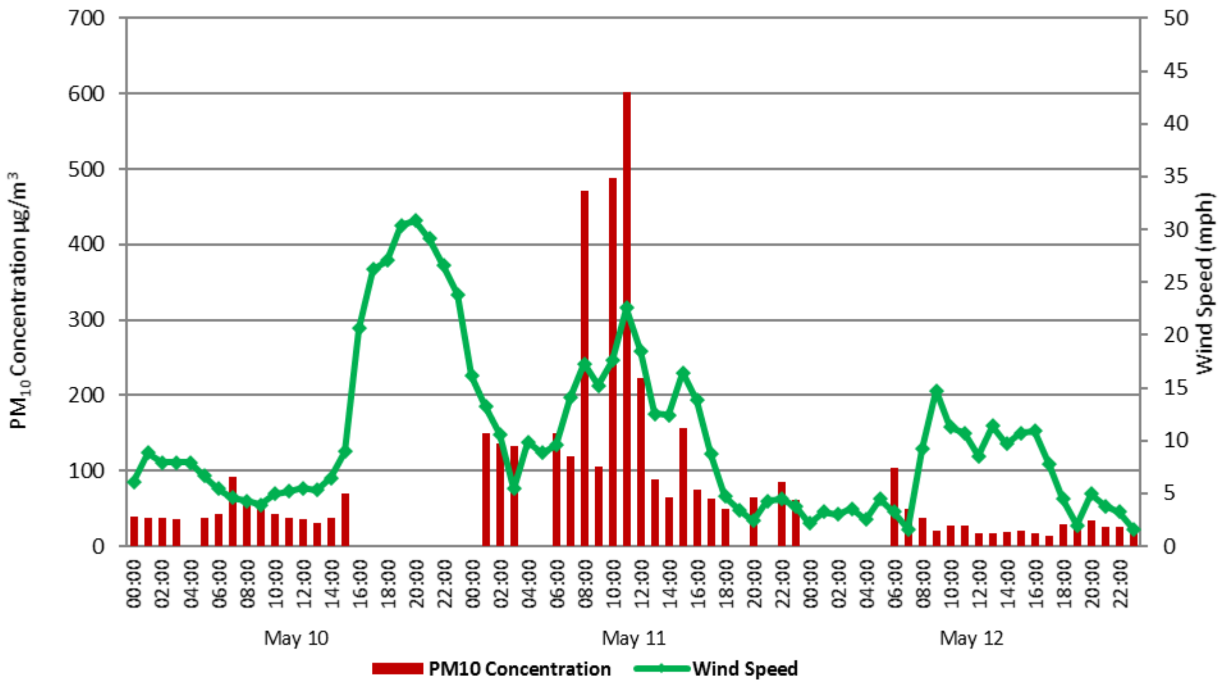

Fig 5-7: The graph illustrates the correlation of the Niland PM_{10} concentrations and gusty winds. Niland station wind data utilized. Data gaps during the evening hours of May 10, 2014 occurred when the instrument failed to meet critical criteria requirements. This occurs when saturation of the inlet causes flow rates to fall below standards. Air quality and wind data from the EPA's AQS data bank

In order to understand the totality of the regional impact and the impact to the Niland monitor, **Figure 5-8** is a three-day depiction of the associated PM_{10} concentrations at stations located upwind of Niland. For the morning hours on May 10, 2014 all stations showed low levels of concentrations as winds were light. However, as winds increased during the afternoon on May 10, 2014, concentrations showed a similar increase across the board. As the winds continued through the next day, the concentrations elevated during the morning and afternoon hours on May 11, 2014. In all likelihood, there existed suspended particles from the previous evening of May 10, 2014. The pronounced data gap occurred when the instrument's inlet became saturated failing to meet critical criteria requirements set by the USEPA. As winds returned to relatively light conditions during the evening hours on May 11, 2014, so did concentrations.

Figure 5-9 shows hourly PM_{10} levels at regional sites contrasted with the observed visibility at Imperial County Airport (KIPL) and Palm Springs International Airport (KPSP). Palm Springs serves as an "upstream" airfield, while Imperial Airport is "downstream" from Niland. Both airports reported reduced visibility on May 10, 2014 and May 11, 2014. The reported visibility issues and/or blowing sand at these airports over the two-day period supports that the exceptional event was regional.

FIGURE 5-8
72 HOUR TIME SERIES PM_{10} CONCENTRATIONS

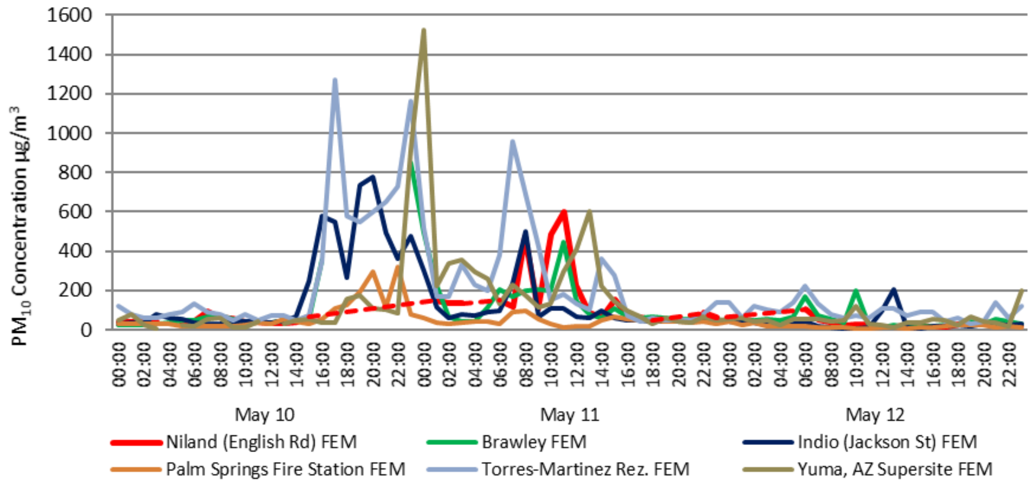

Fig 5-8: The graph illustrates the regional affect as other monitor measured elevated hourly concentrations on May 10, 2014 and May 11, 2014. Dashed red line indicates data gaps and does not infer low concentrations. Air quality data from the EPA's AQS data bank

FIGURE 5-9
72 HOUR TIME SERIES PM_{10} CONCENTRATIONS AND VISIBILITY

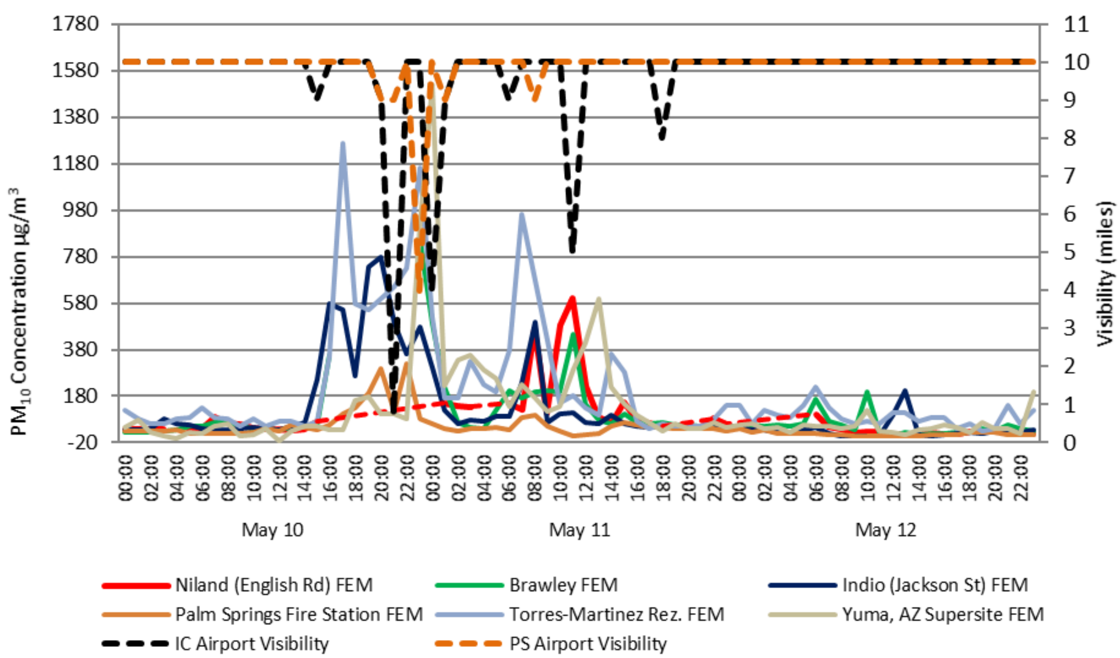

Fig 5-9: Illustrates the observed visibility measured at Imperial County Airport (KIPL) and Palm Springs Airport (KPSP) over a three-day period. Visibility data from the NCEI's QCLCD data bank. Air quality data from the EPA's AQS data bank

As mentioned above, as the upper level trough continued to move inland digging into the Great Basin before reaching the Four Corners region on May 11, 2014 onshore pressure gradients continued to increase causing the issuance of at least 17 different notices advising of the gusty westerly winds. Both the Phoenix and San Diego NWS offices issued Urgent Weather Messages, Public Information Statements, Preliminary Storm Reports, and Hazardous Weather Outlooks that contained wind advisories and dust advisories. A useful measurement of the degradation of air quality is the Air Quality Index (AQI).[14]

Figure 5-10 provides the resultant AQI for May 11, 2014. As the upper level low moved into the Four Corners region the level of reduced air quality can be ascertained when the AQI goes from a "Yellow" or a moderate level to a "Red" or an unhealthy level. As high winds affect Imperial County on May 11, 2014, windblown dust causes elevated concentrations and reduced air quality. **Appendix A** contains copies of notices pertinent to the May 11, 2014 event.

FIGURE 5-10
AIR QUALITY INDEX FOR NILAND MAY 11, 2014

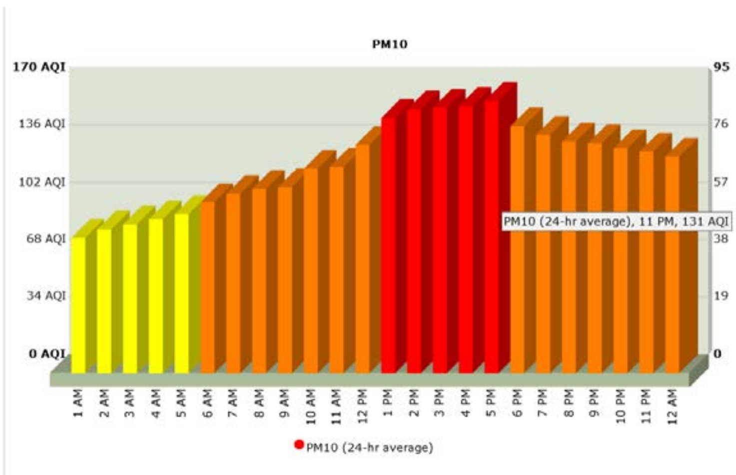

Fig 5-10: Reduced air quality is evident when warnings go from a yellow or a moderate level to red or an unhealthy level.

V.2 Summary

The preceding discussion, graphs, figures, and tables provide wind direction, speed and concentration data illustrating the spatial and temporal effects of the gusty winds associated with the upper level low that entered the Four Corners on May 11, 2014. The information provides a clear causal relationship between the transported windblown dust and the PM_{10} exceedance

[14] The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health affects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country.

measured at the Niland monitor on May 11, 2014. Furthermore, the advisories and issued air quality alert illustrate the affect upon air quality within the region extending from all of Imperial County, the southern portion of Riverside County, and Yuma, Arizona.

FIGURE 5-11
MAY 11, 2014 WIND EVENT TAKEAWAY POINTS

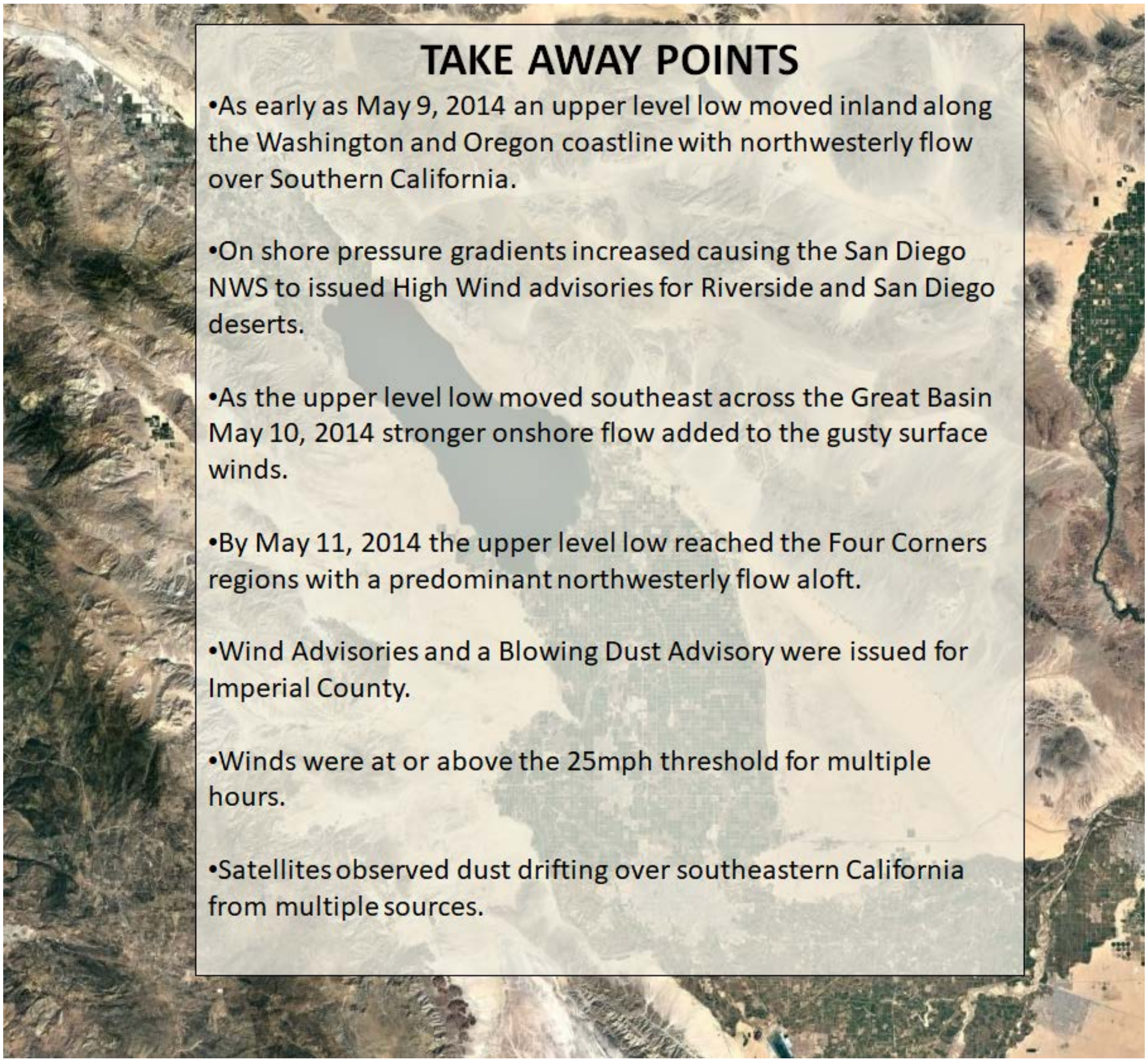

Fig 5-11: Illustrates the factors that qualify the May 11, 2014 natural event which affected air quality as an Exceptional Event

VI Conclusions

The PM_{10} exceedance that occurred on May 11, 2014, satisfies the criteria of the EER which states that in order to justify the exclusion of air quality monitoring data evidence must be provided for the following elements:

TABLE 6-1
TECHNICAL ELEMENTS CHECKLIST

	EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM_{10})	DOCUMENT SECTION
1	A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s)	6-27
2	A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation	40-54
3	Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section	28-32
4	A demonstration that the event was both not reasonably controllable and not reasonably preventable	33-39
5	A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event	33-51

VI.1 Affects Air Quality

The preamble to the revised EER states that an event has affected air quality if the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation. Given the information presented in this demonstration, particularly Section V, we can reasonably conclude that there exists a clear causal relationship between the monitored exceedance and the May 11, 2014 event, which changed or affected air quality in Imperial County.

VI.2 Not Reasonably Controllable or Preventable

Section 50.1(j) of 40 CFR Part 50 defines an exceptional event as an event that must be "not reasonably controllable or preventable" (nRCP). The revised preamble explains that the nRCP has two prongs, not reasonably preventable and not reasonably controllable. A natural wind event, which transports dust from natural open deserts, meets the nRCP, when sources are controlled by BACM and when human activity plays little to no direct causal role. This demonstration provides evidence that despite BACM in place within Imperial County, high winds overwhelmed all BACM controls where human activity played little to no direct causal role. The PM_{10} exceedance measured at the Niland monitor caused by naturally occurring strong gusty west winds transported windblown dust into Imperial County and other parts of southern California from areas located within the Sonoran Desert regions to the west and southwest of Imperial County. These facts provide strong evidence that the PM_{10} exceedance at Niland on May 11, 2014, was not reasonably controllable or preventable.

VI.3 Natural Event

The time series plots of PM_{10} concentrations at Brawley during different days, and the comparative analysis of different monitors in Imperial and Riverside counties demonstrates a consistency of elevated gusty westerly winds and concentrations of PM_{10} on May 11, 2014 (Section V). In addition, these time series plots and graphs demonstrate that the high PM_{10} concentrations and the predominantly northerly winds were an event that was widespread, regional and not preventable. Arid conditions preceding the event resulted in soils that were particularly susceptible to particulate suspension by the elevated gusty northerly winds. Days immediately before and after the high wind event PM_{10} concentrations were well below the NAAQS. Overall, the demonstration provides evidence of the strong correlation between the natural event and the windblown dust emissions to the exceedance on May 11, 2014.

VI.4 Clear Causal Relationship

The time series plots of PM_{10} concentrations at different areas in Imperial and Riverside County monitors demonstrates a consistency of elevated gusty winds and concentrations of PM_{10} at the Niland monitor on May 11, 2014 (Section V). In addition, these time series plots and graphs demonstrate that the high PM_{10} concentrations and the gusty winds were an event that was widespread, regional and uncontrollable. Unusually arid conditions preceding the event resulted in soils that were particularly susceptible to particulate suspension by the elevated gusty winds. Finally, days immediately before and after the high wind event had PM_{10} concentrations well below the NAAQS. Overall, the demonstration provides evidence of the strong correlation between the natural event and the entrained fugitive emissions to the exceedance on May 11, 2014.

VI.5 Historical Concentrations

The historical annual and seasonal 24-hr average PM_{10} values measured at the Niland monitor were historically unusual compared to a multi-year data set (Section III).

Appendix A: Public Notification that a potential event was occurring (40 CFR §50.14(c)(1))

This section contains issued notices by the NWS and Imperial County pertinent to the June 26, 2014 event. Along with NWS notices, this Appendix contains any issued air quality alerts. Air quality alerts advise sensitive receptors of potentially unhealthy conditions in Imperial County resulting from a natural event. On May 11, 2014, the data illustrates a region-wide increase in wind speeds and wind gusts coincident with the arrival of dust and high PM_{10} concentrations in Imperial County.

Appendix B: Meteorological Data

This Appendix contains the time series plots, graphs, wind roses, etc. for selected monitors in Imperial and Riverside counties along with other pertinent graphs, time series plots for other areas if applicable. These plots, graphs and tables demonstrate the regional impact of the wind event.

Appendix C: Correlated PM_{10} Concentrations and Winds

This Appendix contains the graphs depicting the correlations between PM_{10} Concentrations and elevated wind speeds for selected monitors within Imperial, Riverside, San Diego, and Yuma counties if applicable. Other areas are also included if applicable such as Mexico. These graphs demonstrate the region wide impact of the wind event.

Appendix D: Regulation VIII – Fugitive Dust Rule

This Appendix contains a description of the compilation of the BACM adopted by the ICAPCD and approved by the USEPA. Seven rules numbered 800 through 806 comprise the set of Regulation VIII Fugitive Dust Rules.